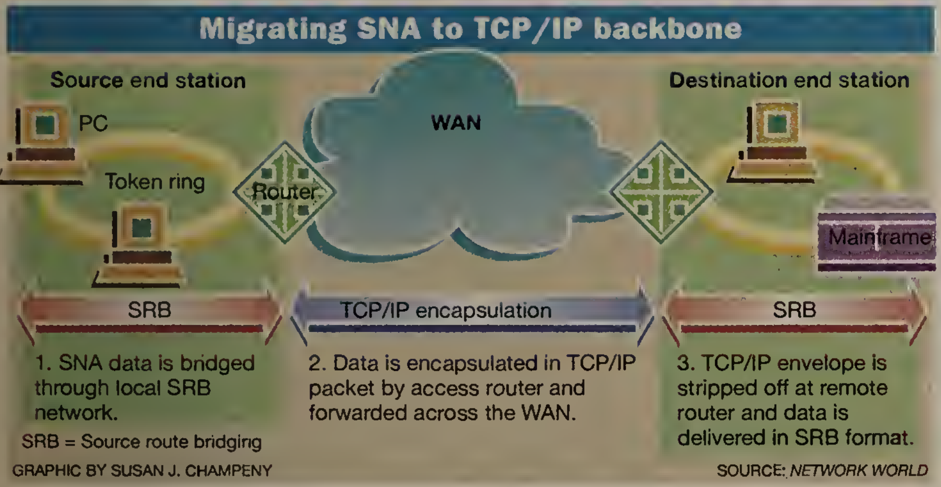
NETWORK WORLD
THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING
AN INTERNATIONAL DATA GROUP PUBLICATION ◆ VOLUME 10, NUMBER 32 ◆ AUGUST 9, 1993


Migrating SNA to TCP/IP backbone
Source end station
Destination end station
PC
Token ring
Router
WAN
Mainframe
SRB
TCP/IP encapsulation
SRB
1. SNA data is bridged through local SRB network.
2. Data is encapsulated in TCP/IP packet by access router and forwarded across the WAN.
3. TCP/IP envelope is stripped off at remote router and data is delivered in SRB format.
SRB = Source route bridging

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: *NETWORK WORLD*

SNA users getting all wrapped up in TCP/IP

Second in a four-part series on SNA/LAN integration.

BY MAUREEN MOLLOY

Look at a typical enterprise today, and you're likely to find at least two distinct nets running in parallel: one for routable local-area network traffic and another for legacy IBM Systems Network Architecture data.

But in an effort to satisfy cost-cutting decrees, more and more users are beginning to integrate their highly reliable SNA nets into comparatively less sturdy multiprotocol internets by encapsulating SNA in Transmission Control Protocol/Internet Protocol packets.

Automaker Nissan Motor Corp. and rustic retailer L.L. Bean, Inc. are both using this popular SNA/LAN integration method.

NISSAN

Prior to deploying a Cisco Systems, Inc.-based router internet, Nissan's network consisted of four IBM main-

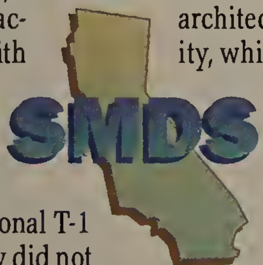
See SNA, *page 71*

Calif. user looks to SMDS for statewide net upgrade

BY BOB WALLACE

San Francisco

The California State Automobile Association (CSAA) has embarked on the most ambitious Switched Multimegabit Data Service (SMDS) networking project to date, replacing its aging multidrop net with SMDS at nearly 100 locations across the state.



CSAA chose Pacific Bell's SMDS over higher speed multidrop lines, fractional T-1 and T-1 because the company did not want to add staff to support an expanded private network and wanted to minimize equipment expenditures.

"We decided there weren't any business advantages to maintaining our own network, and SMDS relieved us of that responsibility," said John Gilboy, manager of data center services for CSAA.

"SMDS is easier to use, and its mesh architecture provides higher reliability, which is critical to us."

Under the $6 million agreement, Pacific Bell is arranging the acquisition of Cisco Systems, Inc. 4000 series routers and Digital Link Corp. DL 2000 SMDS data service unit/channel service units (DSU/CSU) for CSAA's net.

See SMDS, *page 70*

NEWSPAPER
100

New AT&T unit will lead ATM charge; switches to ship in Q1

BY BOB WALLACE
AND JIM DUFFY

Parrying IBM's ATM thrust, AT&T last week created a company that will spearhead the development of Asynchronous Transfer Mode products for user networks.

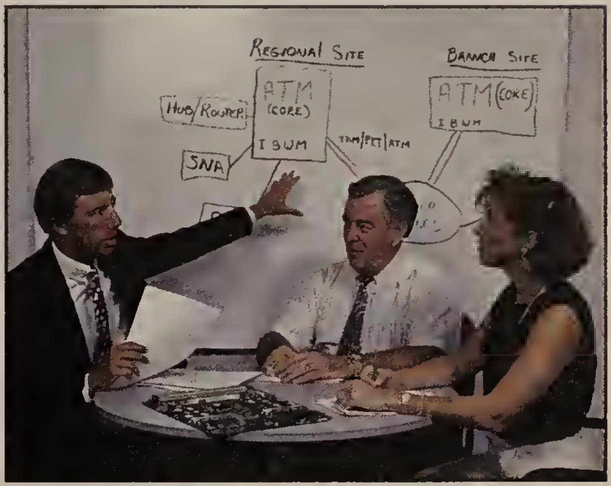
The new Cell Relay Systems unit, formed by AT&T Paradyne and AT&T Network Systems, is developing two ATM switches, dubbed the SN-2000 ATM Integrated Service Platforms, that will be available in the first quarter of next year.

In related news, AT&T's NCR Corp. subsidiary is expected this week to announce ATM wares for its line of local-area network hubs that will work with the SN-2000 switches.

Although AT&T would not comment on the issue, its plans are seen as an effort to keep IBM from cornering the market on a network technology whose early roots sprouted at AT&T Bell Laboratories.

Users make do while waiting for ATM. Page 67.

IBM recently announced a family of ATM products (*NW*, July 19, page 1) and said it is pouring some $100 million per year into developing the technology.



AT&T 's Chris Morton (left), Tom Storey and Jeanne Reber plot ATM switch course.

Cell Relay Systems comprises personnel from AT&T Paradyne, AT&T Network Systems and AT&T Bell Laboratories. It also draws on each of the groups' technical resources.

"AT&T has begun to share technology, expertise

See Switches, *page 70*

Start-up aims to patrol net applications

BY BOB BROWN

Redwood City, Calif.

A start-up company with strong ties to Oracle Corp. has quietly begun selling software that helps users manage databases, Unix systems and applications across enterprise networks.

Patrol Software, Inc.'s DDS/Patrol package uses "smart" agents to handle local management chores and gives administrators a complete graphical view of applications and systems across the net.

DDS/Patrol will be formally introduced this fall when Patrol announces marketing partnerships with several big players, including Data General Corp. and Sequent Computer Systems, Inc. Relationships with other vendors may be announced, but details were not available at press time.

DDS/Patrol was designed to help users monitor and manage Oracle databases and Unix systems. But the company is beta-testing management modules for other databases, including those from Informix Software, Inc., Ingres and Sybase, Inc., as well as appli-

See Patrol, *page 70*

BT puts virtual reality spin on network mgmt.

BT Laboratories uses 3-D models as aid in managing national telephone network.

BY ELIZABETH HEICHLER

London

Look into the future of network management, and you'll see another world – that is, if you're at BT's advanced research laboratories, where they're using virtual reality to simplify management of the carrier's complex network.

As far as network management headaches go, BT has a big one. Its national telephone network includes 25 million customer lines and 6,000 switching centers that generate 5M bytes of status information every five minutes. In addition, the voice, data and video services BT offers are growing more complex, and its Global Networking Services for corporate customers involve links to other carriers' networks.

The Systems Research Division at BT Laboratories in Martlesham Heath, England, has been looking at ways to reduce that complexity and has found a potential solution in virtual reality software.

"Virtual reality has an important role to play in understanding complexity," said Paul Rea, senior professional in the division.

Off-the-shelf personal computer software, called Superscape, from Dimension, Ltd. of Aldermaston, England, was used to build interactive, three-dimensional models – or "virtual worlds" – representing aspects of BT's network.

Using special input devices, users can move through these virtual worlds and interact with

See Virtual reality, *page 71*

PAGE TWO

Briefs

Terms of endearment. BT and MCI Communications Corp. have signed a final agreement on their global alliance that calls for BT to pay $4.3 billion for 20% of MCI. The carriers plan to invest $1 billion over five years in a new joint venture to provide worldwide net services. Chris Earnshaw, BT's managing director of worldwide networks, will head the joint venture, which has not been named.

GTE launches first AIN service, lands user. GTE Telephone Operations last week said it will bring up in September its first service based on Advanced Intelligent Network (AIN) equipment provided by AT&T Network Systems.

In the AIN architecture, carriers develop advanced services on adjunct computers called service nodes that are linked to network switches, rather than use proprietary switch code. GTE's Custom Routing Service will be used first by the American Automobile Association Auto Club South to have calls redirected to alternate sites if agents at the original destination are busy.

Special delivery. Microsoft Corp. last week announced Microsoft Mail for PC Networks 3.2 Special Edition, a version of the company's electronic mail package bundled with third-party products from Beyond, Inc., Systems Compatibility Corp. and Management Software, Ltd.

The special edition of the E-mail software will feature rules-based mail filtering, absentee notification and management capabilities. Under a six-month promotion, Microsoft will offer the special edition of its E-mail software at $995 for 10 users.

New image. WordPerfect Corp. will hold a press briefing at this week's GroupWare '93 conference in San Jose, Calif., to unveil plans for new imaging technology and to introduce six imaging technology partners. The partners will include Imagery Software, Inc., PaperClip Imaging Software, Inc., Simplify Development Corp., Watermark Software, Inc. and others not yet revealed.

Picture us together. PictureTel Corp. and Toshiba Corp. have agreed to explore ways the companies could combine PictureTel's videoconferencing technology with Toshiba's desktop and laptop computers. Toshiba also signed an agreement to distribute PictureTel's videoconferencing products in Japan.

Combining 800. Southwestern Bell Telephone Co. reached agreements with a number of long-distance companies — Sprint Corp. foremost among them — to market its regional Maximizer 800 service with long-haul toll-free offerings.

Marketed as Complementary 800 Service, the combined local and long-distance package gives Southwestern Bell's 800 service national visibility.

ADP defects. Automatic Data Processing, a high-profile Sprint user, signed a three-year, multimillion-dollar agreement to switch its 800 and virtual network traffic to AT&T.

ADP said it made the move for a number of reasons, including "economics, technology and a new AT&T attitude," but would not discuss specifics. ADP's AT&T Software-Defined Network will support more than 250 sites here and in Canada and Europe. The company will also use AT&T's Software-Defined Data Network service.

Fresh claims. AT&T last week countered MCI claims of victory during 800 Fresh Look with its own set of figures. During Fresh Look, AT&T says it held on to 505 of its 531 of its custom net users. AT&T said those 505 customers represent $2.5 billion in annual revenue, while its potential loss amounts to only $90 million.

Contacts

ADDRESS: Network World, 161 Worcester Rd., Framingham, MA 01701. PHONE: (508) 875-6400; FAX: (508) 820-3467; INTERNET: network@world.std.com.; BBS: Interact with other readers: download free software, submit letters to the editor, leave news tips, change of address requests or hunt for jobs by using your IBM, Apple or other computer to dial into the BBS at 300 to 2,400 bit/sec (8N1) at (508) 620-1160 or at speeds up to 9.6K bit/sec by dialing (508) 620-1178. READER ADVOCACY FORCE (R.A.F.) HOTLINE: Contact us with story tips about pressing user issues, (800) 622-1108, Ext. 487; NETWORK HELP DESK: Contact Susan Collins via any of the above means.

Network HELP desk

Network World tracks down answers to your questions regarding products, services, technologies or disputes with vendors. Please submit questions to Susan Collins at (800) 622-1108, via fax at (508) 820-3467 or via the Internet at scollins@world.std.com.

I am the supervisor of a Novell, Inc. NetWare 3.11 network. To do system maintenance, I need to have all end users log off the network. This can be a problem if end users at remote sites log on to the network and walk away from their terminals without logging off. Is there a way I can log them off from my console?

Victor Fanberg, Dublin, Ohio

Ronald Nutter, escalation manager of 900 Support, a 24-hour, seven-day a week Novell technical support company in Lake Oswego, Ore., replies:

User connections can be cleared at the file server console by using the monitor.nlm, a standard NetWare Loadable Module that allows you to monitor the server. To load monitor.nlm, type LOAD MONITOR at the file server: prompt.

If your file server is at a remote site, type FCONSOLE at the DOS prompt. Select Connection Information, highlight the name of the user whose connection to the server you want to clear, and then press the DEL key. You will be prompted with a dialogue box confirming that the connection has been cleared.

I am a technical support manager for the Latin American region of a large corporation. I would like to know when vendors plan to implement new, cost-effective technologies such as Integrated Services Digital Network, frame relay and Asynchronous Transfer Mode (ATM) in this part of the world.

Mike Vidal, Miami

Len Elfenbein, president of Lynx Technologies, Inc., a Little Falls, N.J.-based consultancy specializing in international networks, replies:

While there are many joint ventures between carriers in Latin America and vendors and carriers in the more developed countries, it will still be years before local facilities in Latin American countries

See **Help desk**, *page 54*

CONTENTS

NEWS

4 *Dept. of Veteran Affairs* readies for imaging system.

4 *Madge Networks* says FDDI cards first step in delivering technology across line.

4 *IBM to define* new management role.

6 *FCC opens up* local loop.

6 *Grand Junction intros* FastLink family of high-speed LANs.

6 *Saros rolls out* front-end to document mgmt. system.

8 *Stratus shows off* new fault-tolerant Unix servers.

8 *Lotus makes things* easier for Notes Mac clients.

67 *Newton gets* new network links.

68 *ADSM uses* mainframes for backup.

ENTERPRISE INTERNETS

11 Ascom Timeplex unveils new high-end router.

11 Ascend switches on routing.

11 Migration to ATM makes frame relay key to SNA users.

13 Scientific-Atlanta uses VSATs to connect distributed LANs.

LOCAL NETWORKS

21 Novell rolls out NetWare for OS/2.

21 SynOptics details plan for high-speed LAN product.

21 Artisoft redefines peer strategy to stay abreast.

24 Microsoft still growing despite troubled market.

GLOBAL SERVICES

29 Battle brews over new numbering plan.

29 AT&T gives users 'Maximum Advantage.'

29 National net offers ATM, Ethernet links.

32 ARDIS ups net speeds, readies roaming feature.

32 Carrier launches service aimed at single-site firms.

CLIENT/SERVER APPLICATIONS

39 Avoiding costly mistakes when selling net apps.

39 Environmental concerns spur largest electronic index system.

39 IDC study weighs database vendor support.

40 WordPerfect intros gateway to IBM Office Vision/VM.

41 SQL group wraps OSI spec.

FEATURES

44 Opinions/Letters

47 Buyer's Guide picks through group collaboration tools to help you harvest products that will bear the fruits of increased worker productivity.

55 Steve Jobs takes on the job of pitching NextStep as a groupware application development tool.

58 Action Center

64 Networking Marketplace

65 Networking Careers

TYPICAL
SOLUTIONS
WOULD BE FINE IF
EVERYONE
WERE TYPICAL.

No two businesses have exactly the same needs. That's why ***Sprint's custom GVPN*** *(Global Virtual Private Network) is never the same twice.*

Take, for instance, the case of one international company. Their problem: global time zone differences made their business day too short. Our solution: let executives access the network from their car phones and thereby extend the business day. Thanks to our efforts with a local cellular carrier, company executives can now connect to any office worldwide by dialing a simple seven-digit number. Sprint is the first carrier in history to design such a system. And Sprint can customize an ideal solution for your company, too.

After all, no one else does business the way you do. Or the way we do, either. For more information on Sprint's GVPN, ***call 1-800-827-4800.***

Sprint.

Be there now.

© 1993 Sprint Communications Company L.P.

AGENCY OVERHAUL

Dept. of Veterans' Affairs readies net initiatives

BY ELLEN MESSMER

McLean, Va.

The Department of Veterans' Affairs, the mammoth federal agency trapped in a mire of incompatible information systems, has launched several technology initiatives designed to improve veterans' access to benefits and hospital services.

WOODS

VA officials last week said the Veterans Benefits Administration is readying a request for proposal for imaging systems at its 58 regional offices nationwide to convert paper records to electronic format. And the Veterans Health Administration has started looking for a way the VA hospitals can store and share radiological images.

In a separate effort, the VA intends to finalize by next June a plan for setting up an archive system to centrally warehouse administrative data.

At that time, the VA will reveal its broader network strategy for linking all of its offices and hospitals.

All of these efforts are expected to result in significant network purchases next year. But the VA's reluctance to support the Government Open Systems Interconnection Profile (GOSIP) procurement mandate and the government's review of the future of GOSIP requirements (*NW,* July 26, page1) raise questions about how the agency will proceed.

It is hard to imagine a more difficult project than modernizing the VA, whose 250,000 employees nationwide operate dozens of hospitals and administer benefits to about 26 million veterans.

"There are many inconsistencies in the [current] system," acknowledged Robert Woods, the VA's deputy assistant secretary for information resource management (IRM), during a conference at Mitre Corp. last week to discuss the agency's future plans with the industry.

Veterans seeking services today have to complete forms repeatedly because each benefits office or hospital is largely isolated from the others.

Even the VA's internal financial management systems are incompatible and out-of-date with federal accounting standards.

One of the VA's goals is to create a Master Veteran Record that could be shared by all VA service divisions and to which veterans would have access.

Woods received word last week of the Office of Management and Budget's support of the concept.

But the VA has a long way to go to bring the idea to a reality. All veterans' files originate with the Department of Defense, which has no set procedure for transferring files to the VA. This communication gap forces VA personnel to track down files at various Army, Navy and Air Force offices.

The VA also has to get its own house in order before it can more quickly process veterans' requests.

Just last week, the VA began swapping out a variety of incompatible financial management databases, upgrading them with finance system software provided by American Management Systems, Inc.

Use of a single accounting system will let the VA standardize on a single electronic data interchange interface, said Harold Metcalfe, director of the VA's financial management system.

The VA, which is considering making EDI mandatory with its suppliers, wants to greatly expand EDI usage and is setting up an electronic bulletin board for bids later this year.

While the EDI plans are fairly solid, the VA's overarching data communications strategy is somewhat uncertain.

The VA's most recent network, the Burial Operations Support System, which links administrative systems for VA cemeteries across the country, is based on TCP/IP, said Bill Barnes, chief of the systems integration center.

VA officials said they have not established a GOSIP implementation strategy in spite of the fact the GOSIP procurement mandate has been in effect for nearly three years.

Instead, the VA has opted for TCP/IP as an interim strategy, said Mark Herway, associate deputy assistant of security of IRM.

"We want to push toward GOSIP," Woods said. "But we're not mandating it yet because the products aren't out there."

How the VA works

With nearly a quarter-million employees, the Department of Veterans' Affairs is one of the largest U.S. government agencies, with 3 main service divisions:

The Veterans Health Administration.
Operates a health care system that includes 171 medical centers, 371 outpatient clinics and 131 nursing homes.

The Veterans Benefits Administration.
Provides pensions, compensation for injuries, insurance, loans, vocational training and other services for 26 million veterans.

The National Cemetery System.
Oversees 114 cemeteries.

SOURCE: DEPARTMENT OF VETERANS' AFFAIRS, WASHINGTON, D.C.

Madge Networks announces its first FDDI adapters

BY CARYN GILLOOLY

San Jose, Calif.

The second largest token-ring vendor is about to throw its hat into the FDDI ring — pun intended.

Madge Networks, Inc., which trails only IBM in the sale of token-ring cards, this week is expected to bring out a family of Fiber Distributed Data Interface adapter cards that the company claims will be the first in a suite of FDDI products.

"The need for more speed is here," said Martin Taylor, director of product marketing at Madge Networks, which has its North American headquarters here. "New high-end imaging and work group applications are creating a need for a faster backbone."

First in the family will be the Smart 100 EISA Ringnode cards. These are adapters for Extended Industry Standard Architecture (EISA) machines, generally used as network servers, that will support 100M bit/sec transmission over a variety of media.

Unlike other vendors' FDDI products, Madge Networks' offerings will have media "personalities." For copper cabling, the cards will be equipped with a daughterboard that can be swapped out to support either shielded or unshielded twisted pair. A separate card will support fiber.

The Smart 100 EISA Ringnodes will come in both Single Attach Station (SAS) and Dual Attach Station (DAS) configurations. The DAS version can be used to connect a high-end server directly to a dual FDDI ring for better performance and to avoid the need for a hub. It can also connect a single machine to two hubs for fault tolerance.

"We plan to extend FDDI to all our prouducts," Martin Taylor said.

Analysts were not enthusiastic about the rollout and its impact on the industry. "This is not a huge announcement," said Val Shribar, an analyst at META Group, based in Westport, Conn. "This is basically Madge filling out their product line."

Although the company would not offer specifics, Taylor stressed that the cards would not be Madge Networks' only FDDI offerings. "We plan to extend FDDI to all our products," he said. The vendor currently offers local-area network hubs, bridges and network management software.

Madge Networks' Smart 100 EISA Ringnode costs $1,395. The shielded twisted-pair version is available now, while the unshielded twisted-pair version will be available in the fourth quarter of this year.

The Smart 100 EISA DAS Rignode costs $1,995. The shielded and unshielded twisted-pair versions will be available in the third and fourth quarters, respectively.

The Smart 100 EISA Ringnode for fiber cabling costs $1,745 for the SAS version, which is available now, and $2,695 for the DAS version, available in the third quarter.

©Madge Networks: (800) 876-2343.

CORRECTION

A chart on client/server financial applications in the July 26 issue incorrectly listed the phone number for PeopleSoft, Inc. The number is (510) 946-9460.

IBM to define net management role

BY MICHAEL COONEY

Raleigh, N.C.

In the wake of industry criticism that its network management strategy is in disarray, IBM will attempt to clarify its management directions later this month at the INTEROP 93 Fall trade show in San Francisco.

The vendor is expected to detail how NetView will grow to better handle local-area networks and explain what role each of its management platforms, including NetView/6000 and LAN NetView, will play in the future.

"IBM has to clearly define and position its different management platforms in the marketplace," said Atul Kapoor, principal with Kaptronix, Inc., a consultancy in Haworth, N.J. "For the past year or so, they have been sending out confusing and disjointed messages to customers."

According to sources familiar with IBM's plans, the company will discuss future NetView applications that will help the mainframe-based platform manage LANs and client/server environments.

IBM is also expected to promise more automation features that will enable users to eliminate mundane tasks from their management routines. For example, IBM is expected to deliver applications that will let NetView dynamically discover devices on the LANs.

"We'll be enhancing NetView to help it manage work groups to give users better centralized control of their LANs," said Gale Meyer, manager of network management systems for IBM. "Users have a blend of work groups, internetworked LANs and host-oriented enterprises, and we'll be providing the platforms to help them manage that blend."

IN DETAIL

IBM is expected to provide more details on how it will monitor Advanced Peer-to-Peer Networking (APPN) nets via NetView. NetView can handle APPN traffic now but can not recognize the dynamic changes that can occur in APPN nets. Devices that are moved or added must be manually redefined to NetView.

IBM has made inroads on NetView's LAN management, but the message isn't getting out, analysts said.

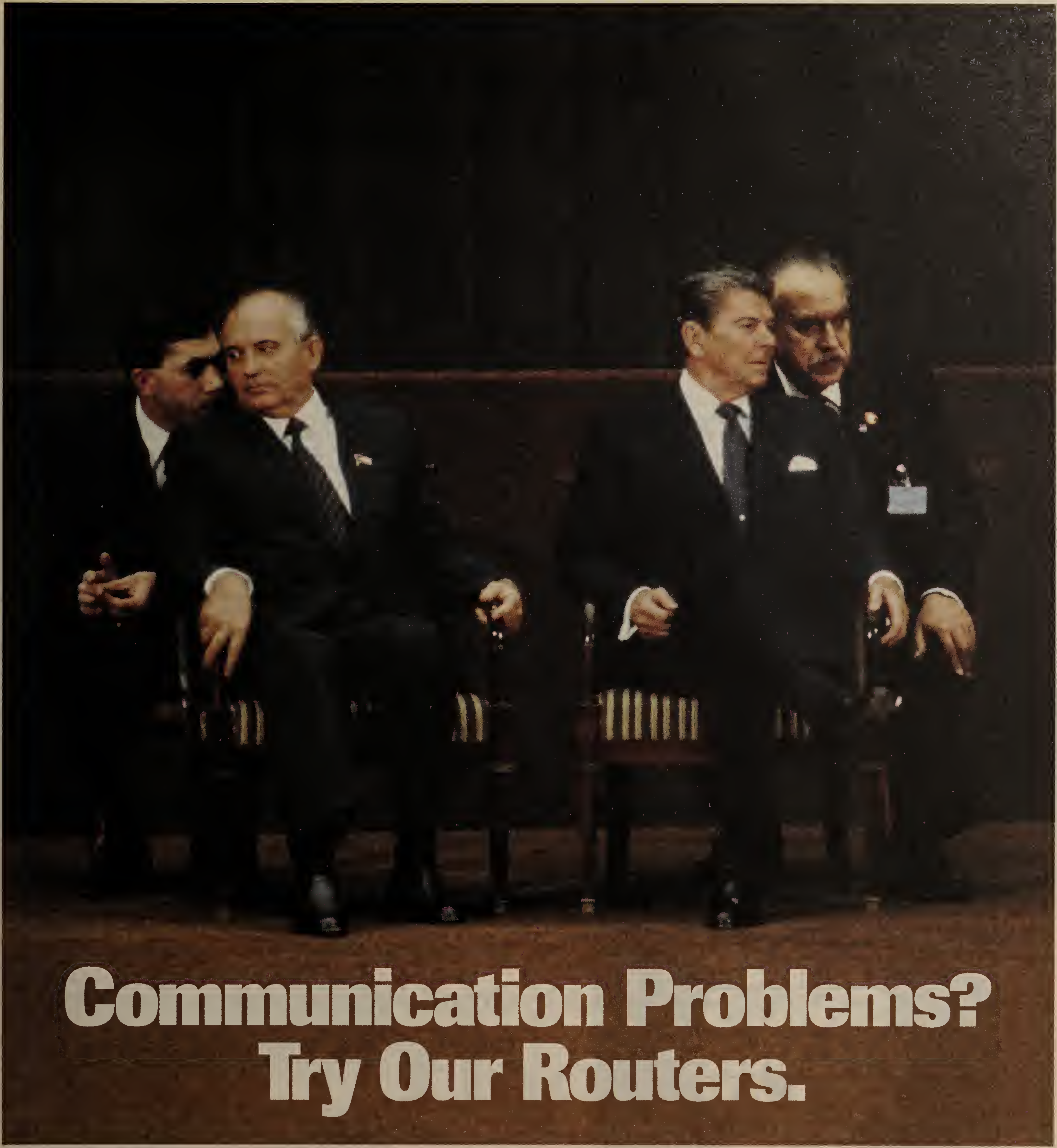
"IBM has let the NetView/6000 group run all over the country saying that NetView/6000 will be the enterprise manager of the future, while the host NetView people have sat by twiddling their thumbs," said one source, who requested anonymity. "No question the NetView/6000 people have been getting the word out properly and the NetView people haven't."

Introduced in 1992 as IBM's entry into the Simple Network Management Protocol arena, NetView/6000 has garnered considerable praise. In addition, future enhancements promise to make it an enterprisewide management contender.For now though, NetView/6000 is positioned as the platform for managing IBM and non-IBM routers and bridges as well as other LAN equipment using SNMP.

The OS/2-based LAN NetView, meanwhile, is put forth as a departmental LAN manager so there is some overlap between LAN NetView and NetView/6000.

Analysts said IBM will continue to position NetView as the flagship network manager for enterprise management, despite that forces both inside and outside IBM are pushing other, more distributed, lower cost solutions.

"There is far too much resistance technologically and politically for IBM to continue developing NetView as a premier management platform," said Robin Layland, principal consultant at Layland Consulting in West Hartfield, Conn. "Most users do not want to invest more on mainframe application development, and the NetView/6000 platform has become an attractive, less expensive alternative for managing LANs."


Communication Problems?
Try Our Routers.

There were times when even the Great Communicator could have used some help. With more worldwide experience than any router manufacturer, Cisco would have been the obvious choice. We've proven ourselves in complex global environments, like SNA. And we work constructively with any protocol. TCP/IP, IPX, Vines, DECnet, OSI — you name it. Call us at 1-800-859-2726, and see how easily the old communication barriers fall.

CISCO SYSTEMS®

©1993 Cisco Systems, Inc. All rights reserved.

Saros rolls out front end for document mgmt. system

BY BOB BROWN

Bellevue, Wash.

Saros Corp. this week will introduce a Microsoft Corp. Windows-based package designed to give end users access to documents regardless of where they reside on a network.

Saros Document Manager 1.0 gives users a graphical means of accessing and manipulating documents via Mezzanine, the server-based document management and retrieval system Saros has been selling since 1989.

Mezzanine sits between the network operating system and applications and provides common access and administration services across networked document and file systems, such as imaging systems. Services include distributed directories, storage management, version control and file backup.

Employed by more than 200,000 users at 200 companies, Mezanine works with Novell, Inc. NetWare, Banyan Systems, Inc. VINES, Microsoft LAN Manager and IBM LAN Server. Until now, its users had to buy client-based front ends for the system from third-party software developers or build their own using the Mezzanine developers' kit, said Mike Kennewick, vice president of marketing at Saros.

"Users love our architectural approach [to document management and retrieval] but they want solutions to take advantage of it," Kennewick said. "Our first step is Document Manager, which provides all the power of enterprise library services out of the box." The availability of a common client interface into Mezzanine should make maintenance and support easier for net administrators, he said.

Document Manager runs from within Windows applications, such as WordPerfect Corp.'s WordPerfect for Windows and Microsoft's Excel, as well as directly from the Windows desktop.

Saros has designed Document Manager with intuitive features to make accessing information easy. For example, end users can define information containers that include offices, cabinets, drawers and folders, allowing them to view information in multiple ways.

The software also features what Saros calls "drop zones" for executing various tasks, such as information searches, via dragging and dropping icons, Kennewick said. It also enables users to build compound documents by linking information from multiple sources and attaching the documents to electronic mail messages or printing them out, he said.

Rick Hellers, controller and MIS director for the four-office law firm of Allen, Matkins, Leck, Gamble & Mallory in Los Angeles, said a client product is an important element for Saros. "I looked at document management systems for a year before deciding on Mezzanine, but I initially discounted the product because I didn't like the front ends that were available for it," Hellers said.

Document Manager will be generally available by October for Windows clients. Unix, DOS and Apple Computer, Inc. Macintosh clients are all planned for release by April 1994.

Mezzanine runs on OS/2 and several types of Unix. It will support Windows NT and run as a Novell NetWare Loadable Module by year end.

Preconfigured to run on as many as three Mezzanine servers, Document Manager will cost $395 per user. It will cost $495 per user when configured to interact with an unlimited number of Mezzanine servers. Current Mezzanine users will be able to buy Document Manager for $169 per user.

©Saros: (800) 827-2767.

HOW MANY WAYS CAN YOU SAY SMART?

T1/E1 & T3/E3
SNMP
SMDS
FRAME-RELAY
ATM
ISO9001
KENTROX

Make ends meet with ADC Kentrox. Get complete details on our line of DSUs and CSUs. Call 1-800-733-5511 for your FREE copy of "The WAN Manager's Guide to Packet Services."

ADC Kentrox
Good people. Good products.

Circle Reader Service #1

FCC opens up local loop

BY BILL BURCH

Washington, D.C.

In a move that could mean lower long-distance rates for switched services, the FCC last week gave competitive access providers (CAP) permission to carry switched traffic between local carriers and long-distance carrier points of presence.

Previously, a CAP could only carry dedicated traffic running from a user site to a long-distance company, thus bypassing the local exchange carrier. If the CAPs undercut local exchange company transport charges, long-distance carriers should be able to reduce rates for switched services. An AT&T spokesman last week said if the carrier's costs decrease, AT&T will try to pass on the savings.

Only those local exchange carriers with more than $100 million in annual revenue will be subject to the new competition. They will likely feel pressure to match the CAPs' lower prices, and one carrier has already responded to the challenge with term and volume discounts for its interconnection customers.

In a Federal Communications Commission filing last week, GTE Service Corp. asked for permission to give discounts on switched access. Under the plan, GTE would give long-distance companies and other users interconnecting for switched access term discounts on one- to five-year contracts.

The FCC ordered all the largest local exchange carriers to file tariffs by Nov. 18, although they will not take effect until Feb. 15.

With the order, the CAPs gain access to the $4.1 billion market for long-distance transport of calls between local carriers and long-haul POPs. In exchange, the FCC will let the locals offer volume and term discounts once state CAP activity has reached prescribed levels.

FCC members' enthusiasm for the order varied. Commissioner Andrew Barrett predicted it would extend the benefits of competition beyond the large businesses enjoying lower long-distance charges through special access, the direct connection of a business to a long-distance carrier's POP. Commissioner Ervin Duggan expressed reservations about giving local carriers pricing flexibility before effective local competition has developed.

One CAP executive who agrees with Duggan was Barbara Samson, senior vice president of corporate development with Intermedia Communications of Florida, Inc.

With switched transport, Intermedia can compete for larger shares of the local transport business, boosting its market from $250 million to $715 million, Samson estimated. But Samson said it is too early to give local carriers pricing flexibility because Intermedia and companies like it are industry fledglings.

Also under the order, CAPs can only compete for 20% of total switched access revenue. The other 80% goes back to the local carrier to cover net ownership and operating expenses.

In a second interconnection order last week, the FCC said some telephone companies' prices on network interconnection for special access are too high. The commission plans to reexamine the charges to make sure that they are cost-based. On the customer side, the FCC extended the Fresh Look period for special access from three to six months.

Similar to the recently completed Fresh Look period for 800 services, Fresh Look for special access allows long-distance companies and anyone else paying switched access fees to local phone companies to break service contracts without penalty. Unlike 800 Fresh Look, individual phone companies notify the public when they will hold a Fresh Look period.

The FCC also mandated local carriers to begin a six-month Fresh Look period for switched access after filing tariffs for the service. Z

FCC lays down the law

Rules for transport of switched traffic from local carrier to long-distance carrier:

✔Competitive access providers free to offer switched transport

✔Local phone company tariffs for switched transport to take effect Feb. 15

✔ Locals allowed to give term, volume discounts on switched transport

✔ 90-day Fresh Look period for switched transport imposed

Rules for special access between a customer and a long-distance carrier:

✔Fresh Look period extended from 90 to 180 days

✔Reconfiguration charges must be cost-based

✔Network access charges to be cost-based and services unbundled

SOURCE: FEDERAL COMMUNICATIONS COMMISSION, WASHINGTON, D.C.

Grand Junction intros FastLink family of high-speed LANs

BY CHRISTINE BURNS

Union City, Calif.

Grand Junction Networks, Inc. this week is expected to announce its FastLink family of high-speed local-area network products, including a hub that combines Fast Ethernet technology with Ethernet switching to provide more effective throughput than traditional 10Base-T hubs.

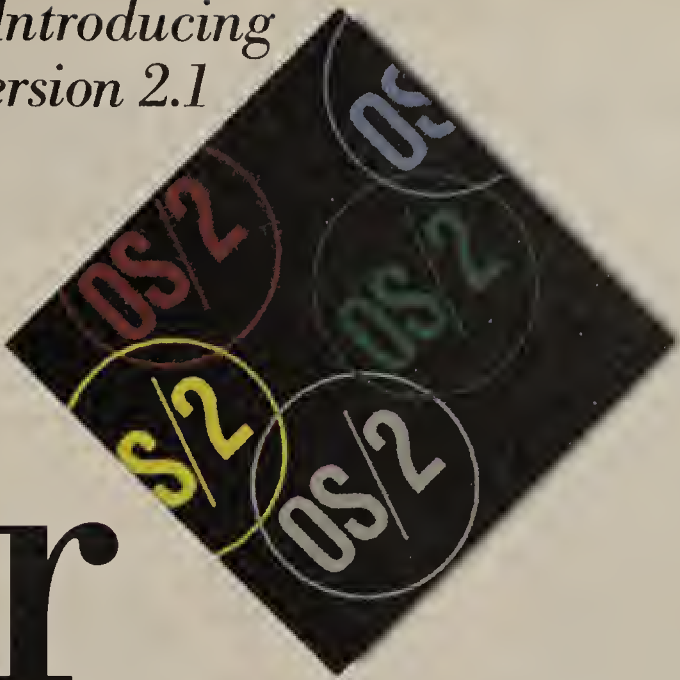
The FastSwitch 10/100 is a 27-port work group switching hub providing 100M bit/sec Fast Ethernet connections to servers and private 10M bit/sec links to clients. The new hub will give as many as 25 clients a clear path to the network file server, eliminating the traditional bottleneck at the server end.

Other members of the FastLink family will be the FastNIC 100 Extended Industry Standard Architecture adapter card, which lets servers connect to FastSwitch 10/100 Fast Ethernet ports, and the FastSwitch 10 hub. The hub provides 24 Ethernet ports, each supporting a full 10M bit/sec connection to a single attached node over existing 10Base-T wiring.

Tests of the FastSwitch 10/100 conducted by the Harvard University Network Device Test Laboratory showed that the device could reach the theoretical maximum forwarding rate when bridging between Ethernets using vari-

See **FastLink**, *page 67*

Introducing
Version 2.1



Now's your chance to run the world.

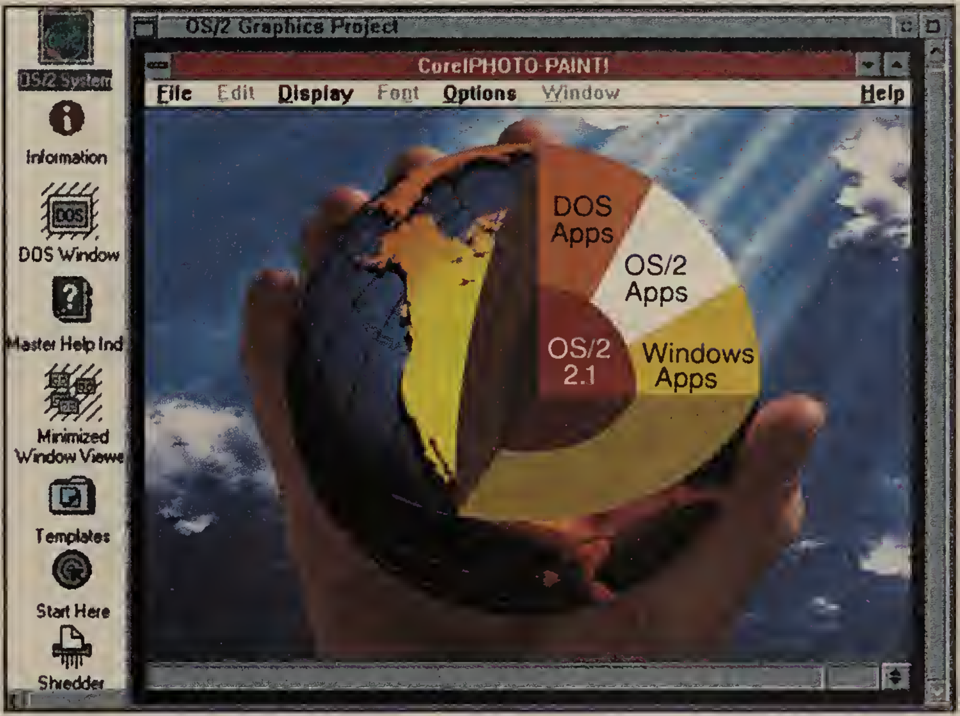
The new OS/2® 2.1 lets you run the latest Windows™ 3.1 applications, in addition to the DOS, Windows and OS/2 applications you're already running—almost any application in the PC universe. Now we've added TrueType fonts, select Windows applets, File Manager and Windows 3.1 printer and display driver support, including 32-bit seamless SVGA support.

You'll also get Advanced Power Management (APM) support for portables, improved multimedia support, pen-based capabilities, CD-ROM and AS/400® terminal emulation support. Plus all the features that made Version 2.0 an award-winner, like true pre-emptive multitasking, OS/2 Crash Protection™ and the easy-to-use object-oriented Workplace Shell™ interface. But now, you also get a new world of possibilities.

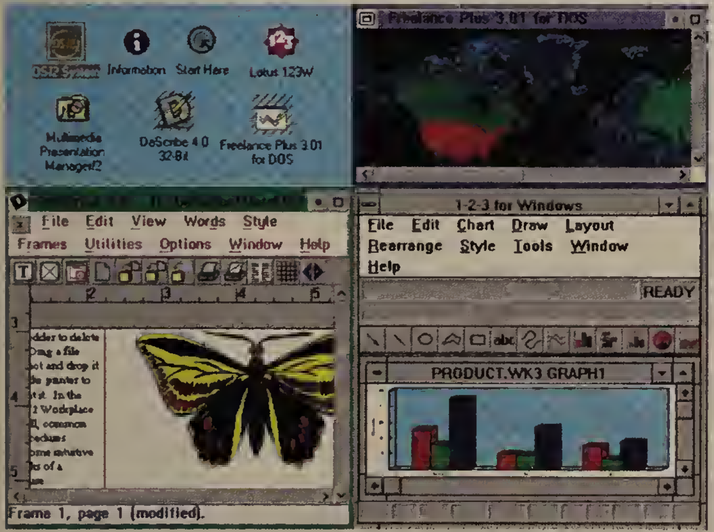
OS/2 2.1 is now also available on a single CD-ROM. It comes with exciting multimedia samplers, full-motion video demos and more. With our free demo diskette, you can find out even more about all the powerful features OS/2 2.1 has to offer. For your copy, to find out more about OS/2 2.1, or to order, call 1 800 3-IBM-OS2. In Canada, call 1 800 465-7999. OS/2 2.1 is also available at your local software dealer.

Call for your free demo diskette.

Demand OS/2 2.1 preloaded on your next PC.



With OS/2 2.1 at the heart of your PC, you can run a world of DOS, Windows and OS/2 applications.



There's no need to buy DOS and Windows to run DOS and Windows applications.

Operate at a higher level.™

IBM

IBM, AS/400 and OS/2 are registered trademarks and OS/2 Crash Protection, Workplace Shell and "Operate at a higher level" are trademarks of International Business Machines Corporation. Windows is a trademark of Microsoft Corporation. TrueType is a trademark of Apple Computer, Inc.
©1993 IBM Corp.

Stratus shows off new fault-tolerant Unix servers

BY JIM DUFFY

Marlborough, Mass.

Stratus Computer, Inc. last week rolled out a line of Unix-based, fault-tolerant servers targeted at users downsizing mainframe applications to distributed client/server environments.

Stratus also unveiled IBM Systems Network Architecture software for the new systems that, among other things, lets them be configured as communications controllers in an SNA net.

In all, Stratus unveiled seven low-end to mid-range XA/R-S Reduced Instruction Set Computing servers, which are all powered by Intel Corp.'s i860 microprocessor and run Stratus' FTX operating system, a multiprocessing version of Unix System V, Release 4 (see graphic, this page). The low-end XA/R-S Models 5-S, 10-S and 15-S boast processing power ranging from 60 to 120 million instructions per second (MIPS). The mid-range Models 25-S, 35-S, 45-S and 55-S range from 60 to 240 MIPS. The low-end models support up to 400 asynchronous communications links, while the mid-range XA/R-S processors support up to 800 asynchronous lines.

Stratus' new XA/R-S servers

Model	Processor	Memory (in bytes)	Disk storage (in bytes)	I/O slots	Price
Low end					
5-S	1 32-MHz i860	256M	26G	28	$69,000
10-S	1 48-MHz i860	256M	26G	28	$130,000
15-S	2 48-MHz i860	256M	26G	28	$230,000
Mid-range					
25-S	1 32-MHz i860	512M	52G	56	$147,000
35-S	1 48-MHz i860	512M	52G	56	$198,000
45-S	2 48-MHz i860	512M	52G	56	$304,000
55-S	4 48-MHz i860	512M	52G	56	$504,000

SOURCE: STRATUS COMPUTER, INC., MARLBOROUGH, MASS.
GRAPHIC BY SUSAN J. CHAMPENEY

The SNA software for the new processors, developed for Stratus by IBM, includes FTX Advanced Program-to-Program Communications and FTX Secondary SNA. FTX APPC lets the Stratus machines be configured as PU 2.1 nodes in an SNA net and engage in peer-to-peer LU 6.2 sessions with similar SNA nodes.

FTX APPC also allows Stratus machines to be configured as end nodes in IBM Advanced Peer-to-Peer Networks (APPN). APPN End Nodes can automatically register themselves with APPN Network Nodes.

FTX Secondary SNA, meanwhile, allows the Stratus servers to be configured as PU 2.0 devices in an SNA net. Thus, they can function as IBM 3174 cluster controllers and establish sessions between an SNA host and downstream devices on LANs.

The XA/R-S servers also run Legent Corp.'s XCOM file-transfer software. XCOM lets them transfer files via LU 6.2 sessions with IBM systems, and Unix, DOS, OS/2 and Apple Computer, Inc. Macintosh platforms, among others, in SNA nets.

The XA/R-S systems will run Novell, Inc.'s NetWare for Unix LAN operating system later this year. When the systems ship in August, they will support Open Systems Interconnection, Transmission Control Protocol/Internet Protocol, X.25 and X.400 protocols, in addition to SNA.

FTX APPC starts at $7,500, and FTX Secondary SNA starts at $6,000. Both products are available now. Pricing for XCOM begins at $14,100. It is available now from Legent.

©Stratus: (508) 460-2000.

Lotus makes things easier for Notes Mac clients

Enhances Organizer to work with cc:Mail.

BY BOB BROWN

Boston

A Lotus Development Corp. official said at last week's MacWorld Expo here that the company is readying new services that will ease communications for Notes users with Apple Computer, Inc. Macintosh clients.

In other Notes news, Edify Corp. this week will announce an application that gives remote users access to information on a Notes server via phone or facsimile. And, Lotus announced a new version of its Organizer electronic calendar designed to work with its cc:Mail electronic mail system.

While Lotus did not officially announce its Macintosh client for Notes at MacWorld Expo, Notes Product Manager John Bartlett was on hand to promote the newly added Notes client. The Macintosh client for Notes began shipping in May with Notes 3.0.

The Macintosh client has been well received, even though it only supports OS/2 Notes servers with AppleTalk drivers. The Macintosh's graphical user interface is a good fit with Notes, which is largely used for creating and distributing documents.

Lotus plans to roll out Transmission Control Protocol/Internet Protocol connectivity from OS/2 servers to Macintosh clients this fall, a move that Bartlett said should appeal to the many corporate shops that run both Macintosh and Unix systems. TCP/IP support is also important to users with Macintoshes linked on Ethernets.

"TCP/IP support would make my life a lot simpler," said Brian Connelly, a knowledge engineer at Public Service Electric & Gas Co., a Newark, N.J., firm. Running AppleTalk over the company's Banyan Systems, Inc. VINES net to support Macintosh clients could cause performance problems due to the broadcasting properties, he said.

By year end, Lotus plans to have Notes out on its first Unix server and client platform, Sun Microsystems, Inc.'s Solaris 1.0, Bartlett said. This release will include TCP/IP connectivity between the Unix server and Macintosh clients, he added.

Lotus is working on a new release of Notes that will include enhancements for Macintosh client users, but Bartlett declined to provide more details. One planned feature is X.25 support, which would ease communications for remote Macintosh users.

However, Lotus does not plan to offer a Macintosh server for Notes. Apple's robust System 7 operating system does not offer the preemptive multitasking technology Notes needs, Bartlett said. "If we could do it, we would," he said, adding that a Macintosh server would be targeted to departmental sites, which Lotus is also going after with its new Windows-based Notes server.

One new enhancement to Notes is being provided by Edify, a Santa Clara, Calif., vendor of work flow software for sales, service and support operations.

Edify has extended its Electronic Workforce software via support for the Vendor Independent Messaging (VIM) component of the Notes application program interface to allow remote Notes users to access information, authorize decisions and forward messages via a push-button phone or facsimile. Remote Notes users will be able to configure the Edify software to automatically fax all Notes messages marked "urgent" to a specified number, among other things.

Previously, mobile Notes users were limited to accessing Notes data at the office via a portable computer with a modem.

Tom Glassanos, vice president of marketing at Edify, said its new application is designed to keep end users tied into collaborative work efforts. As groupware and work flow software proliferate, end users are finding it harder to "leave the assembly line," he said. Edify's software runs on an Intel Corp. 80486-based personal computer running OS/2 and equipped with fax and voice cards.

Separately, Lotus last week announced Organizer 1.1, a version of its Windows-based personal organizer with added group scheduling capabilities. The software will let users conduct searches across nets to find out when colleagues have free time for meetings, minimizing scheduling conflicts.

The group scheduling features will be enabled by Organizer's support for VIM, the Lotus-sponsored specification for E-mail-enabled applications. Initially, the product will run atop cc:Mail, but later it will support other VIM-compliant messaging systems. Meeting requests will be sent as cc:Mail messages, adding no overhead to the mail net.

"This system might actually reduce the number of messages being sent since meetings will be arranged more efficiently," said Barbara Baird, senior marketing manager for Organizer.

Having hooked some 400,000 users on Organizer, Lotus is now extending the product into the group scheduling field, she said. Integration with cc:Mail gives the company an edge in selling it into into cc:Mail's large installed base. Among other things, Organizer 1.1 uses the cc:Mail user directory, Baird said.

Organizer 1.1 will be available later this month for $149 per user with volume discounts available. Organizer 1.0 users can upgrade to 1.1 for $49.

IBM brings multimedia to the AS/400

BY PETER LISKER

Santa Clara, Calif.

IBM last week announced products that will enable its AS/400 minicomputer to support the storage of digital multimedia data, but at a price that may be hard to bear for network managers.

The enhancements to the Application System/400 include the Ultimedia Video Delivery System (UVDS)/400, which allows users to integrate video input into applications from a number of sources, including satellite feeds, cable television, locally broadcast TV, videodisc players, videocassette recorders and live video cameras.

CINDY CHARLES

HANSEN

Also introduced was the Ultimedia Host Support (UHS)/400 software package, which provides user-friendly personal computer-based front-end software for AS/400 multimedia applications.

The new products enable the AS/400 to serve as a repository for digital multimedia information. In addition, AS/400 data can be stored on direct-access storage devices or optical storage connected to the AS/400, instead of on bulky VCR tapes as has previously been the case.

But the announcement presents a mixed bag for network managers. While the new offerings enhance the accessibility and usability of multimedia data, moving this data around the network can exact a high toll on network throughput and capacity.

"We can continue to increase the power of the [AS/400], but that won't solve the problem of adequate bandwidth to effectively move the data from the AS/400 to the end user," said Peter Hansen, program manager for systems solutions in IBM's Application Business Systems division.

"On a 16M-byte Token-Ring, the current limit is approximately 10 [multimedia] sessions, while on the 4M-byte Token Ring, I'd say two sessions would realistically be the maximum," Hansen added.

IBM is clearly trying to position the AS/400 as the premier enterprisewide server for customers anxious to jump into the multimedia arena.

Hansen indicated that there will be further announcements in the next six months and that IBM plans to continue enhancing the system's capabilities to provide an easy-to-use multimedia environment for customers.

With the UHS/400 enhancements announced last week, touch-screen interfaces, video and audio prompting as well as images and graphics supported by the new UHS/400 software can be used to access and manipulate AS/400 database and application information. UHS/400 also now offers support for IBM OS/2 machines in addition to its existing PC-DOS support.

"Customers can now combine the advantages of digital multimedia with the functionality of the AS/400 and build multimedia-based solutions that fit the needs of their businesses," said Glenn Van Benschoten, AS/400 systems manager for IBM's Application Business Systems.

The scheduled availability date for the enhancements is December 1993. Pricing for UVDS is a onetime charge of $8,000, while UHS/400 costs $5,500 (also a onetime charge), plus $500 per workstation.

On August 4, 1993 MFS Datanet Unveiled The First National ATM Network.

MFS Datanet has launched a fully operational national ATM network for high-speed data communications. Our customers already enjoy the advantages of ATM for high-speed LAN interconnect and other applications.

MFS Datanet offers ATM services on a national and metropolitan area basis. The company also offers High-Speed LAN Interconnect (HLI) services based on ATM technology, providing a group of end-to-end internetworking solutions connecting LANs in a single metropolitan area or across the nation. As easily as if they were in the same office, and at full native LAN speeds—or any speed you need.

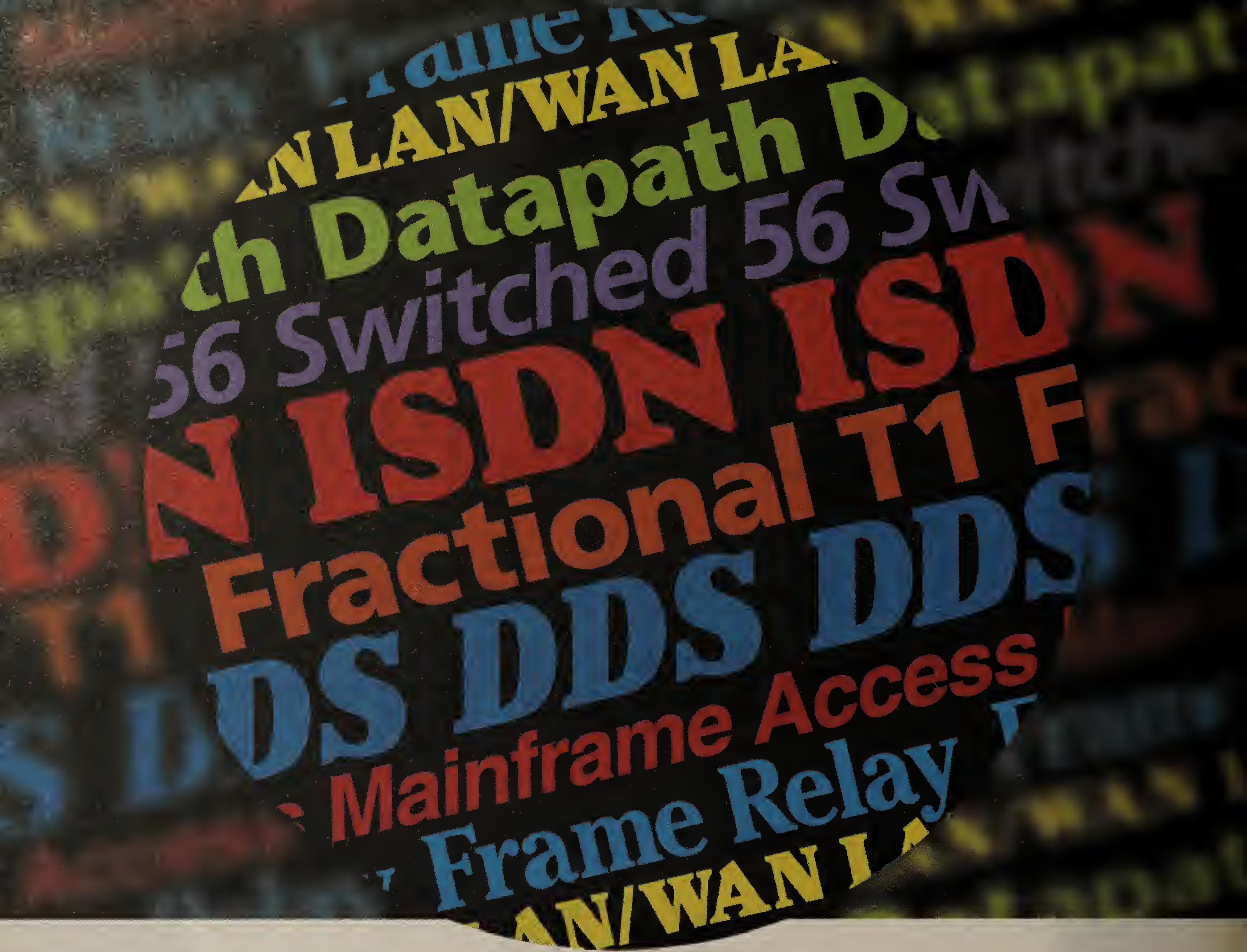
First Qtr 93	**Field Trials**
Second Qtr 93	**Customer Deployment**
August 4, 1993	**National Availability**

MFS
DATANET, INC.

Data Comm
MAGAZINE
HOT
PRODUCTS
1993 AWARD

Call us at 1-800-MFS-4USA 55 South Market, San Jose, CA 95113 (408) 975-2200

Circle Reader Service #19



UDS is Fully Focused on Digital Datacomm

In the accelerating transition from analog to digital datacomm, only UDS has a full line of switched digital devices that communicate across all predominant access technologies (ISDN, Datapath, Switched DDS).

Products are fully developed and ready for shipment to datacomm users whose systems utilize DDS, switched digital, T1, fractional T1, ISDN or any combination of these advanced communications technologies.

UDS digital products include multi-rate DSU/CSUs with speeds to 56/64 kbps, DSU/CSUs for T1 and fractional T1 applications, frame relay, statistical and time-division multiplexers and a broad range of ISDN terminal adapters and network termination units.

Standalone models of UDS digital datacomm products are easily convertible for space-saving, rack-mounted installation in UDS Data Shelf™ enclosures.

Unlike other manufacturers who offer narrow product lines for limited applications, UDS offers a full migration path to all-digital networking.

For complete product information and help in configuring your digital datacomm system, call

800/451-2369

UDS

MOTOROLA

Circle Reader Service #17

Datapath is a trademark used under license by Northern Telecom, Inc.

ENTERPRISE INTERNETS

Data Network Architectures, Standards, Equipment and Management

IBM's ready for frame relay players

Product	Protocol support	Frame r elay interface/speed	Frame r elay availability
3745	APPN, IP, SNA	V.24, V.35, X.21/ T-1 or E-1	Now
3172	APPN, IP, IPX, SNA	V.35, X.21, RS-422/449/ T-1, E-1	Sept.
3174	APPN, IP, SNA	V.35, X.21/128K bit/sec	Jan. 1994
6611	AppleTalk, APPN, DECnet, IP, IPX, NETBIOS, VINES	V.24, V.35, X.21, RS-422/449/ T-1, E-1	Now
973X IDNX	AppleTalk, DECnet, IP, IPX, VINES	V.24, V.35, X.21, RS-442/449/T-1, E-1	Now
AS/400	APPN, SNA	V.35, X.21, RS-422/449/T-1, E-1	Sept.
RouteXpander/2	IP, IPX	V.35, X.21, RS-422/449/T-1, E-1	Now
DOS bridge	Not applicable	V.35, X.21, RS-422/449/T-1, E-1	Jan. 1994

APPN = Advanced Peer-to-Peer Networking

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: IBM, RALEIGH, N.C.

Frame relay to play key role as SNA moves to ATM

BY MICHAEL COONEY

Raleigh, N.C.

Usually, the best way to get from Point A to Point B is a straight line, but that's not the case for IBM SNA users looking to migrate to the company's new Asynchronous Transfer Mode (ATM) products and services.

For over a year, IBM has been touting frame relay as the direction in which Systems Network Architecture users should migrate their Synchronous Data Link Control-based wide-area nets. But now IBM has made frame relay the official stop SNA users should make on the way to building ATM multiprotocol backbones.

IBM last month announced a wide-ranging ATM strategy that included the Transport Network Node (TNN) ATM switch, ATM Intelligent Hub family, network interface cards and ATM chipsets, all in an effort to corner the market on high-speed networks (*NW*, July 19, page 1).

In order to facilitate the frame relay-to-ATM migration scheme, IBM reiterated that it will, in the next 12 months, add frame relay support to all of its primary communications devices and computers — such as the 3172 Interconnect Controller, 3174 communications controller and Application System/400

See **Frame relay**, *page 12*

BRIEFS

Digital Communications Associates, Inc. (DCA) last week announced Version 3.1 of its IRMA Workstation for Macintosh (IWM) 3270 emulator. The new version includes support for TN3270, enabling Macintosh users to communicate with an IBM mainframe over a Transmission Control Protocol/Internet Protocol net.

DCA also doubled the capacity of its MacMainframe 3270 Gateway. Version 6.0 of the product supports up to 128 sessions, and as many as four gateways can now reside in a single Macintosh.

IWM 3.1 is available for $425. MacMainframe 3270 Gateway Version 6.0 will be available in September for between $2,495 and $11,495, depending on configuration.

DCA: (404) 442-4519.

Blueline Software, Inc. of Minneapolis last week announced a new version of its VTAM performance monitor that lets users report VTAM status to Sterling Software, Inc.'s Net/Master net management platform.

Vital Signs for VTAM Version 3.0 also supports Blueline's Novell, Inc. NetWare local-area network monitor — Vital Signs for LANs — so that users can monitor remote LAN performance on the same screen as their VTAM systems. Version 3.0 also lets users centrally collect and display X.25 Network Packet Switching Interface performance statistics from the front-end processor.

Vital Signs for VTAM Version 3.0 is available for $8,680 to $50,000, depending on configuration.

Blueline Software: (800) 826-0313.

Ascom Timeplex unveils new high-end router

Takes on Cisco, Wellfleet with 1.9G box.

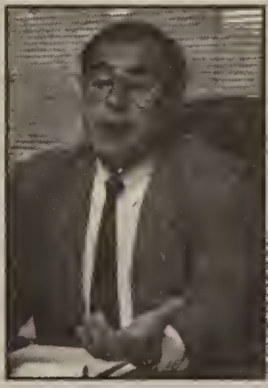
BY MAUREEN MOLLOY

Woodcliff Lake, N.J.

As expected, Ascom Timeplex, Inc. last week joined the high-end router fray with the announcement of a gigabit-speed router that rivals top-of-the-line offerings from Cisco Systems, Inc. and Wellfleet Communications, Inc.

The new router combines routing and frame switching in what the company calls a connection-oriented routing architecture (COR) to address problems encountered in large internetworks. COR lets users dedicate bandwidth to legacy traffic, such as Systems Network Architecture, reduces net complexity and offers integrated net management.

The 1.9G bit/sec Enterprise Router supports token ring, Ethernet and Fiber Distributed Data Interface local-area networks and, on the wide-area side, frame relay and serial ports to T-1 speeds. Future wide-area network interfaces will include Switched Multimegabit Data Services, a High Speed Serial Interface, Integrated Services Digital Network Basic Rate Interface and Asynchronous Transfer Mode (*NW*, June 14, page 1).


JOHN THOMPSON

QUAGLIARA

The 15-slot router supports up to 60 LAN and WAN ports at speeds ranging from 56K to 52M bit/sec and has an aggregate packet forwarding speed of 300,000 packet/sec. That speed will be boosted to 450,000 packet/sec next year via a software driver upgrade.

Like the Wellfleet Backbone Node router, the Enterprise Router uses a Reduced Instruction Set Computing-based multiprocessor architecture where each four-port interface module is equipped with its own Intel Corp. 960 processor and random-access memory. This architecture enables users to add modules incrementally without straining a shared centralized processor.

The router is equipped with fully redundant and hot-swappable components — including optional redundant power supplies — to eliminate a single point of failure and ensure network availability.

Ron Quagliara, vice president and general manager of Ascom Timeplex's LAN Internetworking Business Unit, said the new high entry will help bolster the vendor's presence in the LAN internetworking market and help the company shed the perception that it is simply a T-1 mux maker.

The company is counting on its COR architecture to differentiate the router from other products.

See Ascom Timeplex, *page 68*

Ascend switches on routing

Pipeline provides dial-up digital lines for LAN internets.

BY JIM DUFFY

Alameda, Calif.

Ascend Communications, Inc. last week unveiled a line of access routers that enable users to employ a single device and access line for linking multiple remote office sites to corporate headquarters.

The new Pipeline products combine the functions of Ethernet hubs, inverse multiplexers, data service units/channel service units and Integrated Services Digital Network terminal adapters with Internet Protocol routing in a single enclosure.

"Routing over switched services is a very nascent market," said Robert Ryan, Ascend president and chief executive officer. "Very little's been done with it."

Pipeline comprises three models: the 1600 series for the headquarters site and the 400 and 100 series for remote branches. All models support multiprotocol routing and bridging between Ethernet local-area networks over dedicated or dial-up digital and analog circuits.

The 1600 series is a modular device with an 8M bit/sec backplane that sports two T-1, E-1 or ISDN Primary Rate Interfaces (PRI), one Ethernet interface and six additional slots. The six slots house cards that provide additional interfaces for Ethernet LANs, private branch exchanges, videoconferencing equipment and wide-area network circuits. With the additional WAN links, the 1600 series can support as many as five T-1s or ISDN PRI lines.

The 400 series provides one Ethernet interface, and either one T-1 or ISDN PRI link or as many as four ISDN Basic Rate Interface (BRI), Switched 56K bit/sec or serial connections, which allow users to connect modems to Pipeline for areas that do not have digital carrier services.

The 100 series sports a single Ethernet connector and either a single Switched 56K bit/sec or ISDN BRI interface, or up to four serial ports.

Pipeline Series 1600 and 400 models feature integral "digital" modems that can accept feeds from digital as well as analog lines. The Series 400 and 100 models, meanwhile, also include an optional 12-port 10Base-T Ethernet hub.

Each member of the Pipeline family supports the Routing Information Protocol (RIP) and Static Routes routing protocols for routing IP traffic. In the future, they will support the Open Shortest Path First and RIP II routing protocols, and will route Novell, Inc. Internetwork Packet Exchange (IPX) and Apple Computer, Inc. AppleTalk traffic.

The Pipeline devices also support dynamic bandwidth allocation, meaning they can automatically dial up switched bandwidth to augment a fully utilized leased circuit.

For example, if office sites connected via routers with dedicated 256K bit/sec links need to periodically transfer bulk data files that could congest those links, Pipeline devices can automatically dial up additional switched bandwith. Links of up to 3M bit/sec can be dynamically allocated for backup.

See Ascend, *page 12*

Frame relay

Continued from page 11

mid-range system.

"We think frame relay is the key technology SNA users can implement to begin moving toward high-speed multiprotocol networks," said Jane Munn, manager of IBM's networking architectures.

Frame relay is the ideal migration tool to ATM because it utilizes fast packet-switching techniques and provides a strong link-level connectivity layer for SNA communications, Munn said. Frame relay also provides a standard interface to emerging ATM-based nets.

A key facet to IBM's migration plan is that moving to frame relay generally requires only a software upgrade. Once upgraded to support frame relay, IBM products will be able to link to its ATM hub or TNN switch, which will support direct frame relay connections.

IBM also plans to support the Internet Engineering Task Force's request for comment (RFC) 1294, which will let multiple protocols flow over frame relay nets. By supporting RFC 1294 in its frame relay products, IBM will let users build one network that can support multiple protocols simultaneously — something that could never be done with traditional SDLC links.

"Frame relay is distance-independent and lets users consolidate and set up subnetworks that can share lines as well as support multiple protocols simultaneously, just like ATM will do in the future," Munn said.

IBM has already added frame relay support to its 3745 front-end processor, 6611 router, OS/2-based RouteXpander/2 and its 973X IDNX, the Network Equipment Technologies, Inc. multiplexer that IBM resells.

Analysts and users said the IBM migration strategy was sound for most SNA users, but IBM still has a lot of convincing to do.

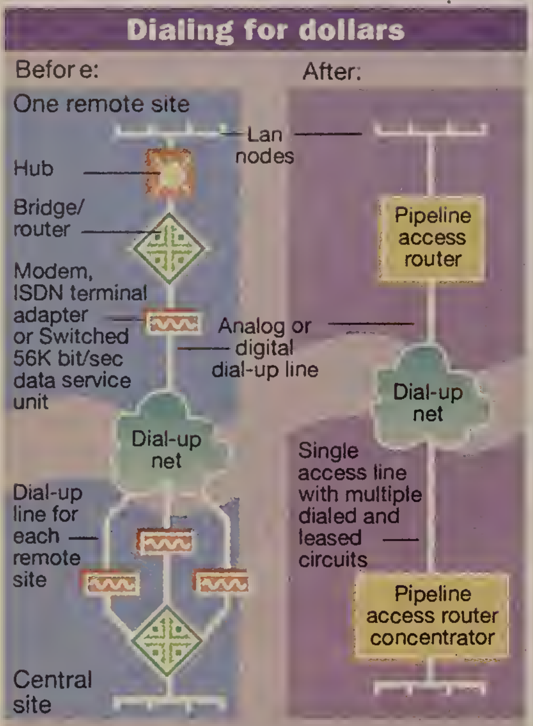
"When IBM announced the ATM products, they really ignored the SNA users altogether, which is a big mistake," said Tom Nolle, president of CIMI Corp., a consultancy based in Voorhees, N.J. "Now at least IBM is articulating a strategy for SNA users to get to ATM, but much more work needs to be done."

"ATM is where we want to be in a couple years, but IBM has a lot to prove to us in the meantime," said Graham Morrison, project leader for network design at Blue Cross/Blue Shield of Connecticut in North Haven.

Munn noted that frame relay has some limitations. For example, she said, frame relay cannot perform error correction and does not support time-sensitive isochronous traffic, which can be a mix of voice, data and video.

The only existing IBM product that will move directly to ATM is the 3172 channel-attached LAN gateway. While the 3172 will get frame relay support by year end, it will also implement ATM technology by the end of 1994 or early 1995. Once the 3172 has ATM support, it will be able to link directly to IBM's future TNN fast packet switch or ATM Intelligent Hub family. ◻

Dialing for dollars


Before:
After:
One remote site
Lan nodes
Hub
Bridge/ router
Pipeline access router
Modem, ISDN terminal adapter or Switched 56K bit/sec data service unit
Analog or digital dial-up line
Dial-up net
Dial-up net
Single access line with multiple dialed and leased circuits
Dial-up line for each remote site
Pipeline access router concentrator
Central site

Before Pipeline, extending the corporate LAN out to branch offices required multiple leased or dial-up access lines and associated equipment. Now only a single access line is needed, which saves on line and equipment costs.

SOURCE: ASCEND COMMUNICATIONS, INC., ALAMEDA, CALIF.
GRAPHIC BY SUSAN J. CHAMPENY

Ascend

Continued from page 11

The Pipeline devices can also automatically tear down those switched connections when the file transfer is complete.

The inverse muxing capability of the Pipeline devices, meanwhile, allows users to pool switched bandwidth into one high-speed circuit.

Analysts were impressed with Ascend's switched digital routing foray.

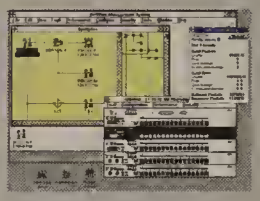
"They've really gone after the integration at the remote site in terms of voice, data, video and so on," said John Morency, a principal analyst at Strategic Networks Consulting, Inc. in Rockland, Mass. "And their pricing looks fairly attractive."

The Pipeline 1600 series starts at $11,000, and it will be available in September. Pricing for the 400 series begins at $5,000, while the Series 100 starts at $3,300. They will be available in October.

✆Ascend: (510) 769-6001.

We have thi

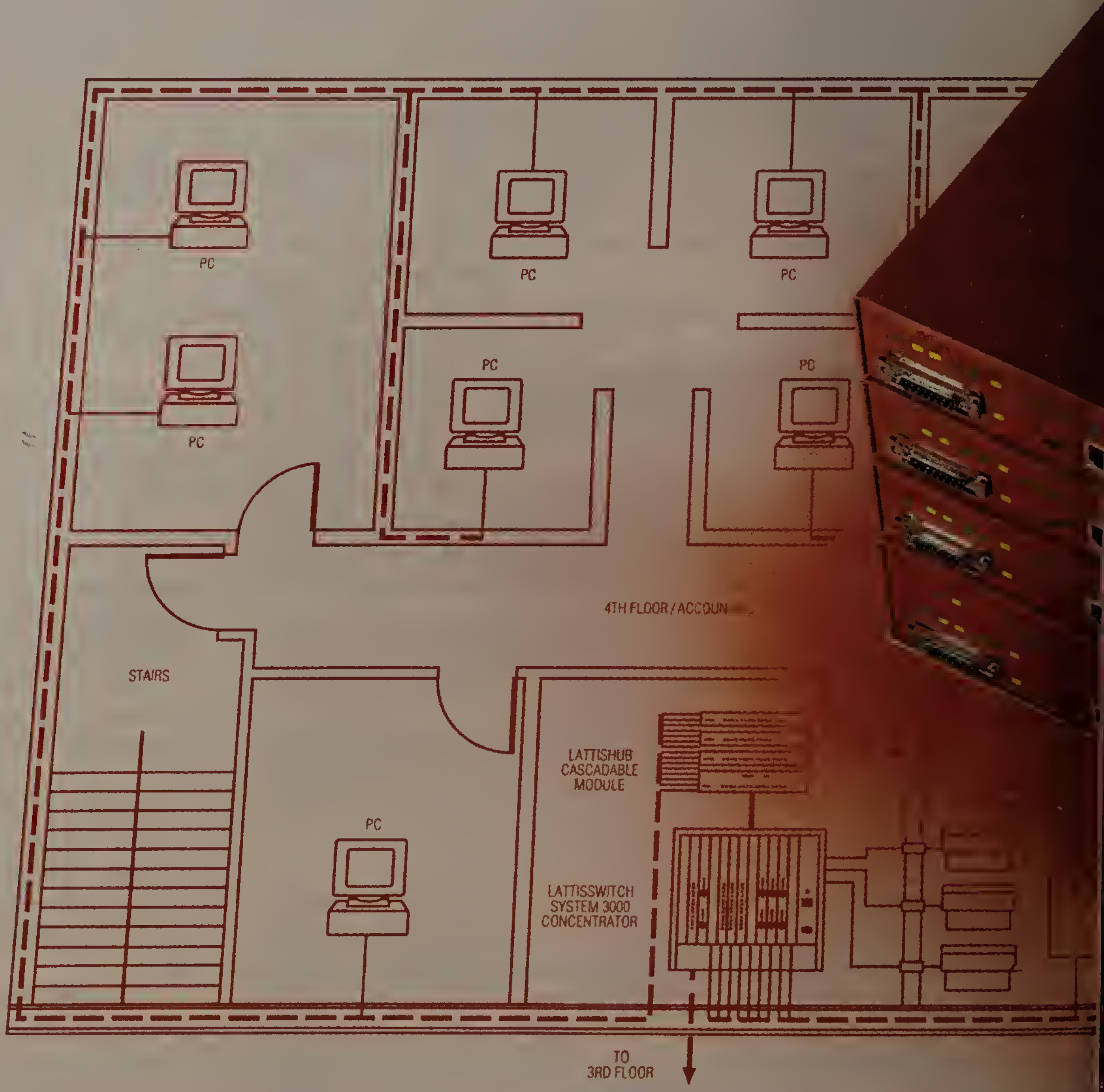
Now you can get the leading integrated solutions in the most popular networking color. Novell® red. Because SynOptics products are now tightly integrated into the Novell NetWare® environment, including the NetWare Management System™ (NMS). In fact, Novell recently chose our LattisSwitch™ System 3000 intelligent hubs for their 1,000-node NetWare 4.0 demonstration at INTEROP.



Optivity™ for NMS™ means easier management of Novell® NetWare® networks.

With network management solutions like SynOptics' Optivity™ for NMS,™ you get an expanded view of your network, plus access to other NMS services. Our Lattis EZ-View™ software, ideal for smaller networks, has Novell IPX support and is YES certified for compatibility with NetWare.

SynOptics' complete line of NetWare-compatible intelligent hub systems lets you build a flexible network that will grow as you do, regardless of whether you need an affordable, high-performance workgroup solution or a stronger foundation for your enterprise network. SynOptics intelligent hub products—whether Ethernet or Token Ring—are easily integrated into


PC
PC
PC
PC
PC
PC
PC
4TH FLOOR / ACCOUN
STAIRS
LATTISHUB CASCADABLE MODULE
LATTISSWITCH SYSTEM 3000 CONCENTRATOR
TO 3RD FLOOR

© 1993 SynOptics Communications, Inc. LattisSwitch, Optivity, Lattis EZ-View and LattisSupport are trademarks of SynOptics Communications, Inc. Novell, NetWare and the Novell YES Certification logo are registered trademarks, and NetWare Management System and NMS are trademarks of Novell, Inc. SynOptics' GSA numbers are GS00K93AGS6170 and GS00K92AGS5494.

Get your own thing for red.

To receive your very own Optivity™ for NMS™ demo disk, simply complete this card and drop it in the mail.

Name ______________________________

Title ______________________________

Company ______________________________

Address ______________________________

City/State/Zip ____________________ Telephone ____________

SynOptics

PCLN9305:NW

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 1038 ANNAPOLIS, MD

POSTAGE WILL BE PAID BY ADDRESSEE

SynOptics

SynOptics Communications, Inc.
c/o TeleSpectrum
Suite 100
190 Admiral Cochrane Drive
Annapolis, MD 21401-9675

Scientific-Atlanta uses VSATs to connect distributed LANs

BY JIM DUFFY

Norcross, Ga.

Scientific-Atlanta, Inc. last week unveiled a very small aperture terminal satellite system for companies requiring high-capacity data transmission to interconnect distributed LANs.

Called SkyRelay, the new VSAT system connects distributed token-ring and Ethernet local-area networks via source route and transparent bridging as well as Internet Protocol routing over a 256K bit/sec frame relay network. Scientific-Atlanta's traditional VSAT products, such as the SkylinX.25, are designed to replace point-to-point dial-up and leased multidrop networks using X.25 packet switching.

Frame relay will increase throughput of data transmissions because it is optimized for bursty LAN traffic and requires less error correction and processing overhead than X.25, said Alan Freece, vice president of worldwide sales and marketing for Scientific-Atlanta.

"It's the [Reduced Instruction Set Computing] version of X.25," Freece said.

SkyRelay is based on a new VSAT earth station hub architecture that features bandwidth-on-demand and bridging and routing functions.

The hub includes a LAN interface card — which Scientific-Atlanta refers to as a brouter — that provides the bridging and routing functions for token-ring and Ethernet LANs.

SkyRelay also supports Transmission Control Protocol/IP's Simple Mail Transfer Protocol for electronic mail, File Transfer Protocol for file transfers, Telnet terminal emulation and Sun Microsystems, Inc.'s Network File System.

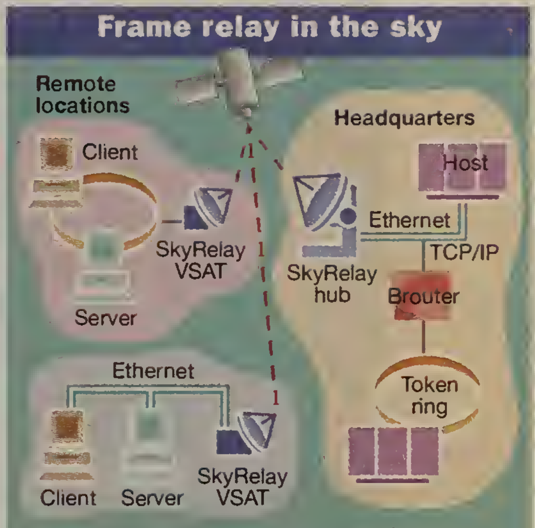
The brouter card can be configured to support a user's particular environment.

It supports several physical LAN interfaces, such as Ethernet 10Base-T, 10Base2 and 10Base5, and 4M and 16M bit/sec token ring over shielded and unshielded twisted pair.

The bandwidth-on-demand feature allows users to divide inbound and outbound satellite bandwidth into separate channels to accommodate peak traffic periods.

One outbound channel is used for typical data traffic loads, while the other is a dynamically adjustable channel used during peak periods.

Frame relay in the sky



Scientific-Atlanta's frame relay-based SkyRelay satellite network is designed for users of distributed, client/server environments, whereas previous VSAT nets were designed to replace multidrop and point-to-point dial-up networks.

SOURCE: SCIENTIFIC-ATLANTA, INC., NORCROSS, GA.
GRAPHIC BY SUSAN SLATER

To ensure availability of inbound bandwidth, SkyRelay also features an "overflow return link" that allows LAN traffic to flow to the hub on a separate link.

The SkyRelay hub is also modular in design, so users can increase capacity as their requirements dictate.

According to analysts, SkyRelay will increase the capability of VSAT networks to carry bursty traffic.

"It's a real improvement for VSAT, but VSATs should only be used when they're more cost-effective [than terrestrial links] and for broadcast requirements," said Carl Pitasi, an analyst at Gartner Group, Inc. in Stamford, Conn.

The new VSAT system marks Scientific-Atlanta's "exit" from the VSAT industry and its entry into the data networking business, Freece said.

"We're not just a multidrop or dial-up replacement," he said.

Scientific-Atlanta also rolled out a network operations console for the SkyRelay system that functions as a centralized monitor for fault isolation, performance reporting, traffic analysis, problem resolution and capacity planning.

The console is a Unix-based Sun SPARCstation with an X Window System graphical user interface and Sybase database.

SkyRelay will ship by the end of the year. Pricing was unavailable as of press time.

ⒸScientific-Atlanta: (404) 903-5000.

thing for red.

Novell NetWare environments. And because they're bilingual, they can be managed through SNMP over IP or IPX.

yes It runs with NetWare

SynOptics' ties with Novell extend to service, too. Our membership in the Novell Technical Support Alliance, along with our new LattisSupport™ service products, provides comprehensive service from planning to installation and maintenance.

By supplying the solutions you need, SynOptics is helping you build the foundation for a strong network fabric—the underlying structure that connects and manages your network. It provides high-speed network communications. And it's flexible enough to grow as your network does, without sacrificing your existing investment.

So call 1-800-PRO-NTWK, ext. 82 or return the attached card to receive a free Optivity for NMS demo disk. And see just how good we look in red.

SynOptics
The Network Fabric of Computing

Circle Reader Service #12

Is time running o

ut for downtime?

The day the earth stood still. You remember it as the five minutes your system went down. Five minutes you didn't have to spare. After all, you're smack in the middle of a rat race. A race so frenetic, you've actually complained that the FAX machine is too slow. You don't have time for down time.

Enter Novell NetWare® SFT-III. Mirrored-server technology that lets you keep two sets of identical data at all times. So when one server needs routine maintenance or (yikes!) goes down, the other server jumps in and takes over. You and your NetWare environment just keep on keeping on. No interruption of network access to important information, no idle employees conducting paper plane experiments.

NetWare + NetWare SFT III = Mission Critical Reliability

All Novell products work together. So your NetWare network is a platform to build on for years to come. That's why, now more than ever, NetWare *is* networking.

Of course there are those people who will miss down time, being as it was the only sleep they ever got. But if you're not one to long for such antiquated occasions, just grab the nearest phone and give us a call at 1-800-554-4446.

We'll send you what you need. In no time.

NOVELL. The Past, Present, and Future of Network Computing.

yes NetWare

Circle Reader Service #11

Clipper Chip targeted at low-speed apps, NIST says

BY ELLEN MESSMER

Gaithersburg, Md.

In the latest revelation about the secret Clipper Chip security system proposed by the White House, government offIcals said the encryption algorithm is initially intended for use only on low-speed, circuit-switched telecommunications networks.

The proposed encryption standard — which was released by the National Institute of Standards and Technology (NIST) for a 60-day public comment period — indicates the Clipper Chip is designed to support scrambling of voice signals, data or facsimile links over terrestrial or wireless links at speeds up to the Integrated Services Digital Network Basic Rate Interface (BRI) rate. As proposed, the standard would not foster equipment interoperability since elements such as signaling and voice encoding techniques used are not included.

The announcement of the proposed Clipper Chip key escrow encryption standard came in late July during a meeting of the Computer Systems Security and Privacy Advisory Board, a group of government and private-sector security experts that advises Congress.

Clipper Chip, which uses the Skipjack private-key encryption algorithm designed by the National Security Agency (NSA), will let the government listen to encrypted transmissions over a network.

While detailing Clipper Chip's low-speed application, NIST officials hinted that the government will release several more encryption algorithms in the future for use at higher speeds. When Privacy Board member Bill Whitehurst, director of data security programs at IBM, asked if multiple algorithms would create an interoperability issue, Miles Smid, NIST manager of the security technology group, admitted it would.

However, the standard proposed by NIST for Clipper Chip in and of itself will not lead to interoperability among devices because it lacks specifics on voice encoding, signaling and other elements.

AT&T, which strongly backs Clipper Chip, offered to license its own technology to fill in the holes to foster interoperability. "We stand ready to talk about licensing our technology so that interoperability will go across vendor lines," said Mike Agee, product manager at AT&T's secure communications system division.

FERGUSON

But Motorola, Inc. rejected that idea. According to Tim Hall, manager of telecommunications products at the secure telecommunications government and systems technology group at Motorola, public domain specifications for signaling and encoding already exist that could be incorporated into the Clipper Chip standard.

Clipper Chip has won little industry support in general, with the most recent criticism coming from the Industry Coalition on Technology Transfer and the U.S. Council for International Business.

The public-key encryption system Capstone, which also uses the Skipjack algorithm and key escrow system, has likewise come under fire because the government has decided to keep the algorithm secret by embedding it in chipsets.

While disclosure of the mathematical basis of the algorithm would not compromise its effectiveness, the NSA deems Skipjack so powerful that it does not want to see it used by forces hostile to U.S. interests.

But Bill Ferguson, vice president of marketing and sales at Semaphore Communications, Inc., attacked the Clipper Chip/Capstone technology as "clearly inferior semiconductor technology" for high-speed telecommunications equipment.

Ferguson said technical specifications supplied by Mykotronx, Inc., the NSA's sole source vendor for both encryption chipsets, indicated that the expected throughput would only reach 56K bit/sec.

But NSA's Brooks called Ferguson's assertions about speed limitations erroneous, saying Clipper Chip will encrypt at up to 15M bit/sec. That's far higher than even the ISDN BRI rate that NIST referred to. A BRI link consists of two 64K and one 16K bit/sec channels.

The Skipjack algorithm is, however, effective. A panel of five security experts found that the algorithm could withstand attack by high-speed computers trying to break the code. A brute-force attack by a powerful computer would take 36 years to crack Skipjack — compared to 10 years for the current standard, Data Encryption Standard, which it is intended to eventually replace.

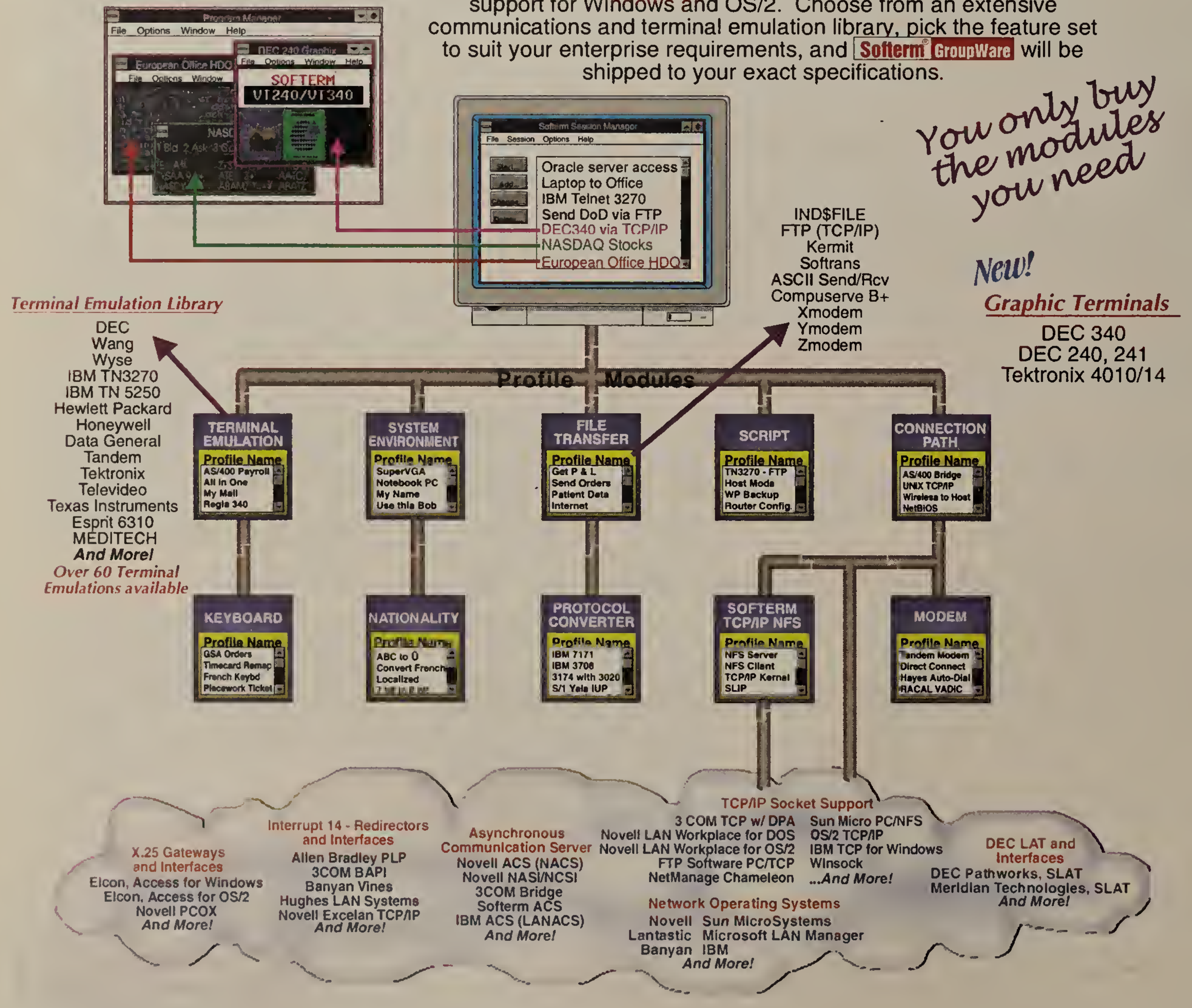
Softerm® GroupWare is rightsizing Communications Software

for mission-critical enterprise networks.

$2.00 to $50.00 per Workstation

1000 user version — 5 user version

When you need to access remote systems through your PC network, Softerm® GroupWare delivers enterprise oriented communication solutions with scalable modularity. You choose the specific feature set for your communication needs. Softerm® GroupWare gives you uniform operating system support for Windows and OS/2. Choose from an extensive communications and terminal emulation library, pick the feature set to suit your enterprise requirements, and Softerm® GroupWare will be shipped to your exact specifications.



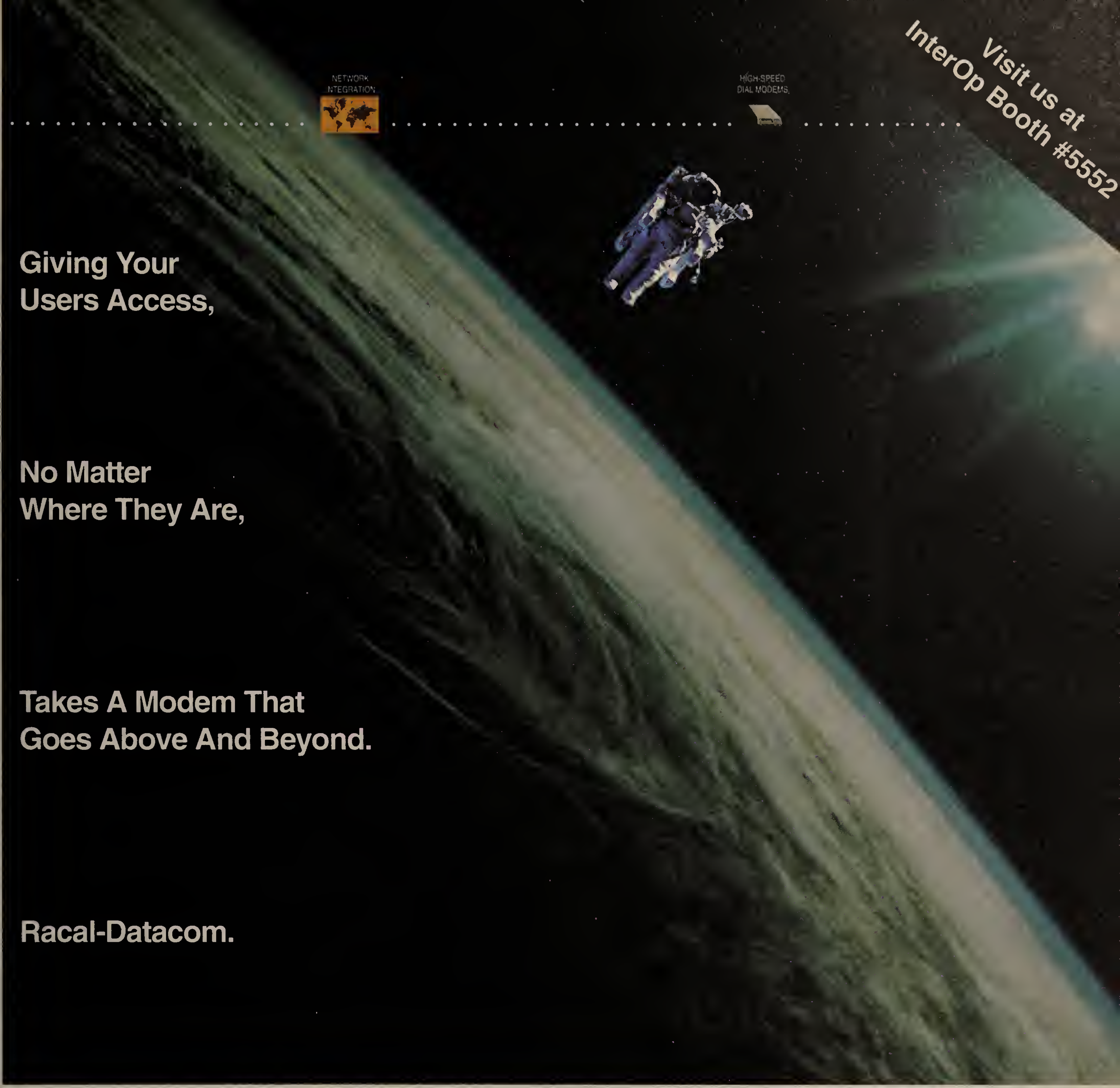
With Value-Based pricing you won't pay for something you don't need.

Call for Product Literature (800) 225-8590

SOFTRONICS, INC. 5085 List Drive, Colorado Springs, CO 80919 - (719) 593-9540 - FAX (719) 548-1878
All product names referenced herein are trademarks of their respective companies.

Circle Reader Service #8

1·800
RACAL
55


NETWORK INTEGRATION
HIGH-SPEED DIAL MODEMS
Visit us at InterOp Booth #5552
Giving Your Users Access,
No Matter Where They Are,
Takes A Modem That Goes Above And Beyond.
Racal-Datacom.

LEASED LINE MODEMS

NETWORK MANAGEMENT

LAN-TO-WAN

The ALM 3226, the new fax-cellular-data portable modem from Racal-Datacom, is proof positive that good things come in small packages. Here's why:

- The only portable modem that operates over standard phone and cellular lines, and provides 14.4 Kbps facsimile capabilities
- High speed fax (up to 14.4 Kbps) and data (up to 57.6 Kbps) transmissions dramatically lower costs
- Cellular capabilities provide immediate access to network data
- Complies with industry standards, including V.32bis, V.32, V.42, V.42bis, MNP Class 5 (data); Group 3 Class 1 and 2 (fax); Racal cellular and MNP-10 (cellular)
- Power options include a 9-volt battery and 110-volt outlet
- Modem Manager™ feature for central control of remote modems

Don't let its small size fool you. The ALM 3226 offers a full range of features, unsurpassed flexibility, and superior performance. It allows even your most remote users to be more productive.

Call us at **1-800-RACAL-55** for information on the ALM 3226 and our complete line of high performance modems. At Racal-Datacom, we'll help you stay connected to your entire network — wherever it happens to be.

The ALM 3226 connecting a laptop to a cellular phone. (Approximate size is 1" X 2½" X 5¼")

RACAL

1·800
RACAL
55

© 1993 Racal-Datacom, Inc. All rights reserved.

Circle Reader Service #16

If managing your server eats up all

Introducing the new HP NetServer LM and LE.

More than just two new servers, we're introducing a profound improvement in the way you monitor and manage them.

Continuous Assistance.
We've put server management right where it belongs. At your fingertips. The HP NetServer Assistant software lets you easily monitor and manage your network servers from a single console–either locally or remotely. So your server stays up and running. Not you.

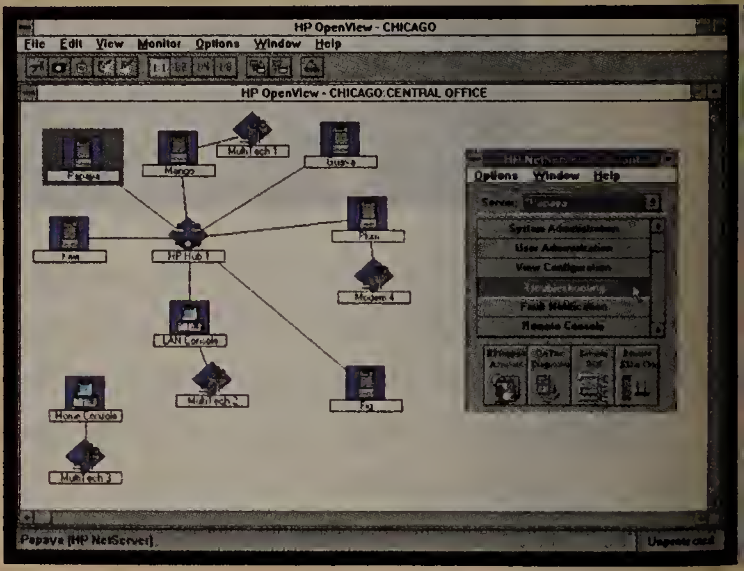
What's more, you can quickly diagnose and solve problems with its intuitive interface and troubleshooting tools. And the HP Support Assistant, a CD-ROM-based library, is included to provide lots of valuable technical information.

Maximum Uptime.
These new HP NetServers lead the pack in reliability. RAID-based disk arrays on the LM provide advanced fault tolerance. And, thanks to our hot-swap capabilities, you can now replace an internal drive without bringing the server–or your network–down. The array will also automatically rebuild data on a failed drive. And for maximum protection, the LM even supports Error Correcting Code memory. In fact, the more critical your data, the more critical these servers become.

Investment Protection.
With technology changing faster than the weather, you'll be happy to know that HP's NetServers are designed to keep pace. And keep your investment protected. Both the LE and LM fit smoothly into multivendor environments. The LE is the ideal entry-level server. Upgradable to the future Intel OverDrive Pentium™ technology-based processor, it provides affordability, exceptional serviceability and future scalability.

Built to meet the full demands of the Pentium processor, the LM will also support dual symmetric multiprocessing. Its Power Cabinet allows room for expansion with nine front-accessible mass storage shelves, eight expansion slots and maximum memory capacity of 384 MB.

HP Service and Network Expertise.
All this is backed by HP's complete range of support services. And by HP's 20+ years of network



HP NetServer Assistant

HP NetServer LM

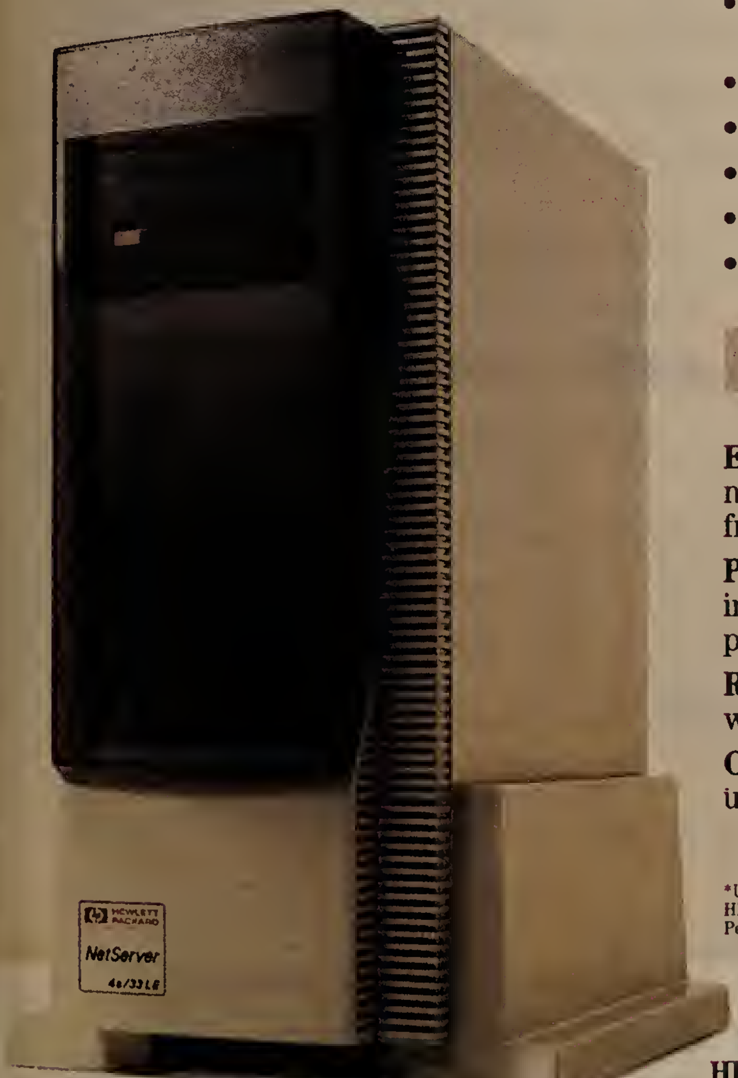
your time, you need an assistant.

systems experience. You can choose support from HP directly, or from your local authorized HP dealer. HP NetServers come standard with a three-year, on-site limited warranty. And a host of 24-hour at-your-service support programs, such as our fax information retrieval service, automated phone support and electronic bulletin board service, ensure easy manageability around the clock.

If all this sounds good, call 1-800-964-1566.
We'll be happy to provide you with fast assistance. And, chances are, without the HP NetServer LM or LE, that's exactly what you need.

intel inside

yes
NetWare
Tested and
Approved



HP NetServer LE

HP NetServer LM $4,849*

- 60-MHz Intel Pentium™ processor, 33-MHz Intel 486 DX and 66-MHz Intel 486 DX2 processors
- Support for dual Pentium symmetric multiprocessing
- High fault tolerance with internal RAID disk array option (RAID 0, 1, 5, 6)
- 16-MB standard RAM, 384-MB maximum memory, ECC memory support
- 128-KB and 256-KB external cache
- 9 mass storage shelves, 3.5″floppy disk drive standard, maximum 8-GB internal storage
- 8 EISA-2 with Enhanced Master Burst bus-master I/O slots
- Integrated Fast SCSI-2, IDE and video controllers
- HP NetServer Assistant software included
- 3-year on-site, next-business-day limited warranty
- Tested and certified on major network operating systems

HP NetServer LE $2,649**

- 33-MHz Intel 486 SX, 33-MHz Intel 486 DX and 66-MHz Intel 486 DX2 processors
- Upgradable to Intel OverDrive Pentium technology-based processor when available
- 4-MB and 8-MB standard RAM, 128-MB maximum memory
- 256-KB external cache
- 4 mass storage shelves, 3.5″ floppy disk drive standard, maximum 3-GB internal storage
- 5 EISA bus-master I/O slots
- Integrated Fast SCSI-2, IDE and video controllers
- HP NetServer Assistant software available as an option
- 3-year on-site, next-business-day limited warranty
- Tested and certified on major network operating systems

HP NetServer Assistant

Easy-to-use centralized management based on HP OpenView's leading network management environment allowing multiple servers in multiple sites to be managed from a single graphical map.

Problem identification and resolution tools including diagnostics, configuration information (whether the network operating system is up or down), disk capacity planning and technical information via a CD-ROM-based library.

Remote management capabilities allow administrators to use the same tools whether at their local console or a remote PC.

Open architecture facilitates adding specialized third-party or HP management utilities.

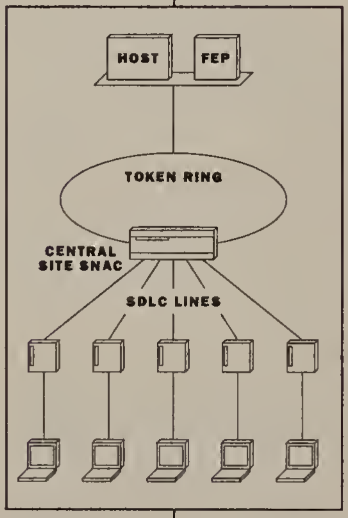
*U.S. list price for HP NetServer LM Model 530, including 486/33DX processor, 16-MB RAM and 535-MB SCSI hard drive. **U.S. list price for HP NetServer LE Model 240, including 486/33SX processor, 4-MB RAM and 240-MB IDE hard drive. Prices subject to change without notice. Pentium and the Intel Inside logo are U.S. trademarks of Intel Corporation. ©1993 Hewlett-Packard Company PPG686

HEWLETT
PACKARD

"IF I TELL YOU HOW MUCH MONEY SYNC'S CENTRAL SITE SNA CONVERSION SAVED ME AT [redacted], I'M DEAD MEAT."

Get the competitive tool companies would rather keep to themselves. The Central Site SNA Conversion Node (CS SNAC) lets you downsize or eliminate FEPs now, and painlessly open your SNA network, with a platform for the further evolution of internetworking. It's available only from Sync Research, the most trusted name in internetworking SNA.

"Once we saw the power of Sync, we told the reps from [redacted] and [redacted] to get lost."



Short-term, the CS SNAC offers potential savings of literally hundreds of thousands of dollars in reduced front-end processor costs. Longer term, by opening SNA, your huge SNA network investment can evolve gracefully, adopting key new technologies and standards like frame relay or APPN as they become appropriate.

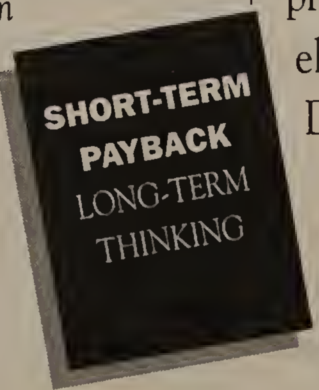
"Our headquarters in [redacted], was the hub of our SNA network. The trick was to increase access to our SNA hosts without killing ourselves financially. Adding [redacted] front-end processors to our network was going to cost [redacted] up front, plus [redacted] every six months in service."

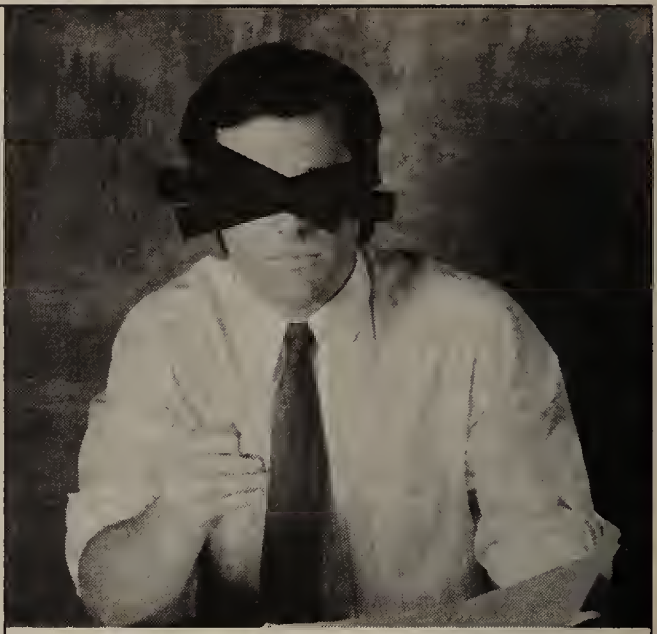
SDLC requires significant FEP resources. But a single CS SNAC can replace up to 28 direct connections, supporting—via multidrop—hundreds of PUs. You can use much smaller FEPs or, in remote concentration applications, replace them entirely.

"The guys from Sync met with me and my boss at [redacted] They showed us how to save about $[redacted] over the solutions from kingpins like [redacted], and the self-proclaimed [redacted] gurus."

Sync specializes in large-scale SNA connectivity. With over a decade of experience in IBM environments, Sync is expert in maximizing availability and minimizing costs.

"The others are just trying to slap your SNA sessions onto the LAN. Managing my [redacted] SNA traffic is too important to trust to that kind of a kluge. We just said, 'If we've got to do it, let's do it right.' Now our billing people in [redacted] can connect with [redacted] data located in [redacted] with the level of reliability we need."





"This technology is our secret weapon. Hey, you're not recording this, are you?"

[redacted]
Network Manager,
[redacted] Inc.

The Sync CS SNAC is 100% compatible with token ring, RS-232, V.35 and V.11 interfaces. It can be fully managed from the NetView console, is NetSpy compatible, and is as tightly integrated into SNA as a native IBM device.

"End result? This puts us head and shoulders above our key competitors: [redacted] and [redacted] I just hope they don't find out about it."

Get the free brochure "Short-Term Payback, Long-Term Thinking," for the whole story. Because you probably won't hear it from anyone else. Call us at 1-800-355-6355, Dept. E61.

SYNC RESEARCH
INTERNETWORKING SNA

©1993 Sync Research. All trademarks are the properties of their respective holders.
International inquiries: Mail or fax your inquiry to Sync Research Database Marketing Services, P.O. Box 391704, Mountain View, CA 94039. Fax: 415-940-4337.

NETWORK WORLD
The Newsweekly of Enterprise Network Strategies

FREE
Pass-Along Subscription Qualification Form

I wish to receive a **FREE** subscription to ***Network World.*** YES ☐ NO ☐

Signature ....Date ....

Business Phone ....FAX ....

Name...
Title...
Company Name...
Division/Department..
Street Address...
City.. State............. Zip...................

Is this your Business Address? Yes ☐ No ☐
Please Answer ALL Questions, Sign and Date the Form.

1 Industry: (check one only)

01. ☐ Manufacturers (other than Computer/Communications)
02. ☐ Finance/Banking
03. ☐ Insurance
04. ☐ Real Estate
05. ☐ Healthcare Services
06. ☐ Legal
07. ☐ Hospitality
08. ☐ Retail/Wholesale Trade/Business Services
09 ☐ Transportation
10. ☐ Utilities
11. ☐ Education
12. ☐ Process Industries (Mining/Construction/ Petroleum Refining/Agriculture/Forestry)
13. ☐ Government, State/Local
14. ☐ Government, Federal
15. ☐ Military
16. ☐ Aerospace
17. ☐ Consultants (Independent)
18. ☐ Carriers
19. ☐ Interconnects
20. ☐ Manufacturers (Computer/Communications)
21. ☐ VAR/VAD/VAN/ Systems Houses
22. ☐ Distributors, Computer Related
23. ☐ Distributors, Communications Related
24. ☐ Other____________________

2 What is your job function? (check one only)

NETWORKING MANAGEMENT
1. ☐ Networking Mgmt. 3. ☐ Datacom/Telecom Mgmt.
2. ☐ LAN Mgmt. 4. ☐ Engineering Mgmt.

MIS MANAGEMENT
5. ☐ MIS, IS, IT Mgmt. 6. ☐ Engineering Mgmt.

CORPORATE MANAGEMENT
7. ☐ Corporate Mgmt. (CIO, CEO, Pres., VP, Dir., Mgr., Financial Mgmt.)

8. ☐ Consultant (Independent)

9. ☐ Other____________________

3 My responsibilities include: (check one only)

1. ☐ LANs/ Internetworking/ WANs 3. ☐ LANs 5. ☐ None
2. ☐ LANs/ Internetworking 4. ☐ WANs

4 What is the total number of sites for which you have purchase influence? (check one only)

1. ☐ 100+ 3. ☐ 20 - 49 5. ☐ 2 - 9. 7. ☐ None
2. ☐ 50 - 99 4. ☐ 10 - 19 6. ☐ 1

5 What is your scope and involvement in purchasing decisions for network products & services for your enterprise?

A. Scope (check one only)
1. ☐ Corporatewide
2. ☐ Multienterprise (consultants)
3. ☐ Departmental

B. Involvement (check all that apply)
1. ☐ Recommend/Specify
2. ☐ Approve
3. ☐ Evaluate

4. ☐ None (A or B)

6 Check all that apply in Columns A and B:

A I am involved in the purchase of the following products/services.
B I plan to purchase the following products/services in the next year.

Involved / Plan to Purchase

A B **LOCAL-AREA NETWORKS**
☐ 01. ☐ Local-Area Networks
☐ 02. ☐ LAN Servers
☐ 03. ☐ LAN Operating Systems Software
☐ 04. ☐ Superservers
☐ 05. ☐ Data Base Servers (Oracle, Sybase, etc).
☐ 06. ☐ Terminal Servers
☐ 07. ☐ LAN Services
☐ 08. ☐ LAN Storage Devices (optical, tape, disk, etc,. including backup systems)
☐ 09. ☐ Network Test Equipment
☐ 10. ☐ Hubs
☐ 11. ☐ Cables, Connectors, Baluns
☐ 12. ☐ UPS
☐ 13. ☐ Network Adapter Boards
☐ 14 ☐ Peer-to-Peer LANs
☐ 15. ☐ Wireless LANs
☐ 16. ☐ SNMP Network Management
☐ 17. ☐ ATM (Asynchronous Transfer Mode)

A B **INTERNETWORKING**
☐ 18. ☐ Bridges
☐ 19. ☐ Routers
☐ 20. ☐ Gateways
☐ 21. ☐ Bridge/Routers
☐ 22. ☐ Hubs
☐ 23. ☐ Intelligent Hubs
☐ 24. ☐ Communications Servers

Involved / Plan to Purchase

A B **COMPUTERS/PERIPHERALS**
☐ 25. ☐ Micros/PCs
☐ 26. ☐ Minis
☐ 27. ☐ Mainframes
☐ 28. ☐ Pen-Based
☐ 29. ☐ Laptops
☐ 30. ☐ Workstations
☐ 31. ☐ Image Processing Workstations
☐ 32. ☐ Front-End Processors
☐ 33. ☐ Terminals
☐ 34. ☐ Printers
☐ 35. ☐ Cluster Controllers
☐ 36. ☐ Fax Machines
☐ 37. ☐ X-Terminals

A B **SOFTWARE/APPLICATIONS**
☐ 38. ☐ Network Management
☐ 39. ☐ Micro to Mainframe
☐ 40. ☐ Security
☐ 41. ☐ Communication/Terminal Emulation
☐ 42. ☐ Word Processing
☐ 43. ☐ Operating Systems
☐ 44. ☐ Business Applications (Finance/Mfg/HR)
☐ 45. ☐ Applications Development
☐ 46. ☐ Data Base Management
☐ 47. ☐ Spreadsheet
☐ 48. ☐ Groupware
☐ 49. ☐ EDI
☐ 50. ☐ E-Mail
☐ 51. ☐ Windows/Graphical User Interface
☐ 52. ☐ 4GL/Development
☐ 53. ☐ Multimedia
☐ 54. ☐ Graphics
☐ 55. ☐ Utilities

A B **WIDE-AREA NETWORK EQUIPMENT/SERVICES**
☐ 56. ☐ Modems (9.6K bps and over)
☐ 57. ☐ Modems (under 9.6K bps)
☐ 58. ☐ T-1
☐ 59. ☐ T-3
☐ 60. ☐ Fractional T-1
☐ 61. ☐ Data Switches
☐ 62. ☐ SMDS
☐ 63. ☐ ATM (Asynchronous Transfer Mode)
☐ 64. ☐ Matrix Switches
☐ 65. ☐ Packet Switches
☐ 66. ☐ Protocol Converters
☐ 67. ☐ Diagnostic/Test Equipment
☐ 68. ☐ DSU/CSUs
☐ 69. ☐ Microwave
☐ 70. ☐ Fax Boards/Modems
☐ 71. ☐ VSAT
☐ 72. ☐ Fiber Optic
☐ 73. ☐ Satellite
☐ 74. ☐ ISDN
☐ 75. ☐ PBXs (over 1000 lines)
☐ 76. ☐ PBXs (under 1000 lines)
☐ 77. ☐ Automatic Call Distributors
☐ 78. ☐ Voice Messaging Systems
☐ 79. ☐ Videoconferencing Systems
☐ 80. ☐ Voice Response/Processing
☐ 81. ☐ Switched Voice
☐ 82. ☐ Dedicated Leased Line
☐ 83. ☐ Switched Data
☐ 84. ☐ Centrex
☐ 85. ☐ E-Mail/On-Line Information
☐ 86. ☐ Image Processing
☐ 87. ☐ Audio Teleconferencing
☐ 88. ☐ Local Services
☐ 89. ☐ WATS MTs
☐ 90. ☐ International
☐ 91. ☐ Virtual Networks
☐ 92. ☐ Frame Relay
☐ 93. ☐ Value Added Services
☐ XX ☐ None of the above (1-93)

7 What is the total number of A: LANs B: Workstations/Nodes in your entire organization?

	LANs A		Workstations/ Nodes B
1.	☐	5,000+	☐
2.	☐	1,000 - 4,999	☐
3.	☐	100 - 999	☐
4.	☐	50 - 99	☐
5.	☐	10 - 49	☐
6.	☐	9 or Less	☐

8 Which of the following network platforms are currently installed/planned in the next year?

NETWORK ARCHITECTURES
Present Planned
☐ 01. ☐ SNA
☐ 02. ☐ DECNET
☐ 03. ☐ MAP/TOP
☐ 04. ☐ TCP/IP
☐ 05. ☐ DCA (Unisys)
☐ 06. ☐ X.25

Present Planned
☐ 07. ☐ NOVELL IPX/SPX
☐ 08. ☐ APPC/APPN/LU 6.2
☐ 09. ☐ NETBIOS
☐ 10. ☐ OSI
☐ 11. ☐ APPLETALK
☐ 12. ☐ OTHER____________________

LAN OPERATING SYSTEM
☐ 13. ☐ LOCALTALK (APPLETALK)
☐ 14. ☐ BANYAN (VINES)
☐ 15. ☐ DCA (IRMALAN)
☐ 16. ☐ DCA (10-NET)
☐ 17. ☐ IBM (LAN SERVER)
☐ 18. ☐ IBM (PC LAN PROGRAM)
☐ 19. ☐ MICROSOFT (LAN MANAGER)
☐ 20. ☐ UNGERMANN-BASS (NET/1)
☐ 21. ☐ NOVELL (NETWARE, 2.X, 3.X, 4.X)
☐ 22. ☐ PROTEON (PRONET)
☐ 23. ☐ SITKA (TOPS)
☐ 24. ☐ 3COM (3+, 3+OPEN)
☐ 25. ☐ ARTISOFT (LANTASTIC)
☐ 26. ☐ HAYES (LANSTEP)
☐ 27. ☐ DEC (PATHWORKS)
☐ 28. ☐ OTHER____________________

LAN ENVIRONMENT
☐ 29. ☐ 4M TOKEN RING
☐ 30. ☐ 16M TOKEN RING
☐ 31. ☐ ARCNET
☐ 32. ☐ ETHERNET
☐ 33. ☐ STARLAN
☐ 34. ☐ FDDI
☐ 35. ☐ LOCALTALK
☐ 36. ☐ 10BASE-T
☐ 37. ☐ OTHER____________________

OPERATING SYSTEM
☐ 38. ☐ DOS
☐ 39. ☐ UNIX/XENIX/AIX
☐ 40. ☐ OS/2
☐ 41. ☐ OS/2 2.X
☐ 42. ☐ MVS
☐ 43. ☐ VM
☐ 44. ☐ VMS
☐ 45. ☐ MACINTOSH
☐ 46. ☐ WINDOWS
N/A 47. ☐ WINDOWS NT
☐ 48. ☐ X WINDOWS
☐ 49. ☐ OTHER____________________

9 For which areas outside of the U.S. do you have purchase influence? (check all that apply)

1. ☐ Europe 4. ☐ Australia
2. ☐ Asia 5. ☐ Middle East
3. ☐ South America 6. ☐ None

10 Which of the following hardware platforms is installed/planned in your company? (check all that apply)

	Mainframes Currently Installed	Planned Next Year	Minis Currently Installed	Planned Next Year
01. DEC	☐	☐	☐	☐
02. IBM	☐	☐	☐	☐
03. AMDAHL	☐	☐	☐	☐
04. AT&T	☐	☐	☐	☐
05. BULL HNIS	☐	☐	☐	☐
06. DATA GENERAL	☐	☐	☐	☐
07. HP	☐	☐	☐	☐
08. TANDEM	☐	☐	☐	☐
09. UNISYS	☐	☐	☐	☐
10. OTHER________	☐	☐	☐	☐

MICROCOMPUTERS
(fill in the numbers)

	NUMBER INSTALLED	NUMBER PLANNED NEXT YEAR
11. MACINTOSH 20, 30, 40		
12. MACINTOSH OTHER		
13. PCs BASED ON 80586	N/A	
14. PCs BASED ON 80486		
15. PCs BASED ON 80386		
16. PCs BASED ON 80286		
17. PCs BASED ON 8086/8088		
18. RISC / UNIX BASED WKSTNS		
19. OTHER		

11 Estimated value of networking equipment and services:

A. Which you helped specify, recommended or approved in the last year?
B. Which you plan to help specify, recommend or approve in the next year?

A		B	
☐	1.	☐	$100 million and over
☐	2.	☐	$50 - $99.9 million
☐	3.	☐	$25 - $49.9 million
☐	4.	☐	$20 - $24.9 million
☐	5.	☐	$10 - $19.9 million
☐	6.	☐	$5 - $9.9 million
☐	7.	☐	$1 - $4.9 million
☐	8.	☐	$500,000 - $999,999
☐	9.	☐	$499,999 or less

12 Estimated gross annual revenue of your entire company/institution: (check one only)

1. ☐ Over $10 billion 5. ☐ $50 to $99.9 million
2. ☐ $1 to $9.9 billion 6. ☐ $10 to $49.9 million
3. ☐ $500 to $999.9 million 7. ☐ $5 to $9.9 million
4. ☐ $100 to $499.9 million 8. ☐ $4.9 million or less

13 Estimated number of employees for your entire corporation:

1. ☐ Over 10,000 4. ☐ 1,000 - 2,499
2. ☐ 5,000 - 9,999 5. ☐ 500 - 999
3. ☐ 2,500 - 4,999 6. ☐ 499 or less

9226

Tired of being second?

Be the first in your company to receive the latest, most comprehensive news and analysis in the networking industry.

Apply today for your personal free subscription to Network World. It's easy… just complete and return this application form.

Fold Here

150,000 network professionals can't be wrong!

Time and time again, network professionals vote Network World the most important publication in the industry.

See for yourself. Just thumb through this issue…

And then… after you're convinced (and you will be)… return your fully completed application to us.

Fold & Tape Here

Apply for your free subscription

today…

We would like to be able to send Network World to anyone who responds. Unfortunately, we must limit the number of free subscriptions we accept in any business category.

Your prompt reply and fully completed application (with name, title, company name and company address) will help to make sure that you receive a preferred subscription.

Fold Here

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO 1752 NORTHBROOK, IL

POSTAGE WILL BE PAID BY ADDRESSEE

NETWORK WORLD
The Newsweekly of Enterprise Network Strategies
PO BOX 3091
NORTHBROOK IL 60065-9928

Artisoft redefines peer strategy to stay abreast

Outlines new products and plans for next few years.

BY CHRISTINE BURNS

Tucson, Arizona

Artisoft, Inc., the leader in the peer-to-peer networking market with its LANtastic network operating system (NOS), is jockeying to stay on the top of the heap in the face of strong competition from both Novell, Inc. and Microsoft Corp.

Artisoft officials point to a 15% increase in revenue in 1993 as a sign of continuing strength in the face of growing competition. Revenue for the year, which ended June 30, was $84.6 million compared to $73.2 million for 1992. But earnings were off, dropping from $13.2 million in 1992 to $9.4 million this year.

In an effort to solidify its position and gird for future competition, Artisoft has released a statement of direction that details the company's strategy for the next two to three years and outlines several new products.

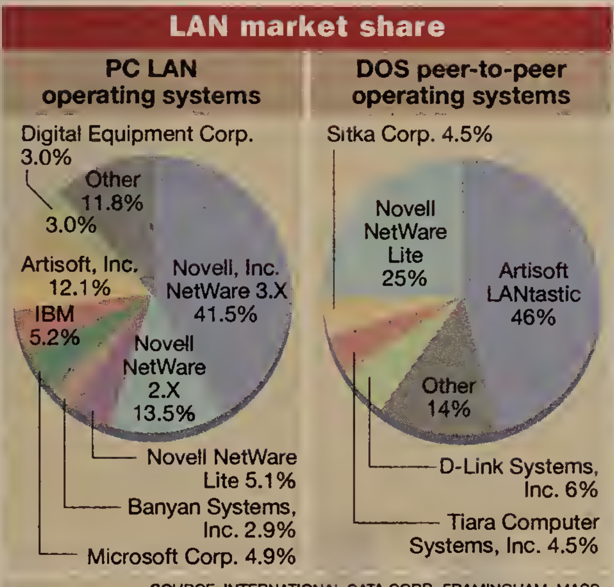
"We're refining our whole strategy, looking at our overall corporate portfolio of products and deciding which products to emphasize," said Ken Karageannes, product manager for Artisoft's NOSes.

LANtastic, introduced in 1987, was one of the first peer-to-peer NOSes. These products enable network nodes to share local-area resources without requiring a dedicated file server. LANtastic Version 5.0 was released in March and supports up to 500 nodes and provides connectivity to Novell's NetWare and Unix nets.

Two years ago, Novell introduced its own peer NOS, a low-end cousin to NetWare called NetWare Lite, and last year Microsoft introduced its solution — Windows for Workgroups.

Novell and Microsoft have been chipping away at LANtastic's market share, which once was as much as 50% of the DOS peer market. Microsoft also plans to integrate peer capabilities into its Windows NT operating system.

"Artisoft has a couple of major threats on the horizon," said David Bayendor, an analyst with Automated Design Systems, Inc., a consulting firm in Atlanta. "So they have to provide something in the white paper that will encourage customers to stay with Artisoft instead of going with NT."


LAN market share

SOURCE: INTERNATIONAL OATA CORP., FRAMINGHAM, MASS.
GRAPHIC BY TERRI MITCHELL

In the white paper, Artisoft segments the market by network size and outlines how it will target the areas.

Since LANtastic generally works well in 11- to 100-node networks, the company will focus subsequent versions on that user base. On the low end, ranging from one to 10 users, Artisoft will offer an entry-level version with scaled-down administration, security

See **Artisoft**, *page 25*

Novell rolls out NetWare for OS/2

BY CARYN GILLOOLY

Provo, Utah

Novell, Inc. last week delivered on its promise to bring together its NetWare 4.X LAN environment and IBM's OS/2 operating system with the release of NetWare for OS/2.

STEVEN BOORNS

NEWMAN

The software is basically an extension of NetWare 4.01 that lets the network operating system run in non-dedicated mode on a workstation running OS/2 2.1. The machine can function as a NetWare 4.01 server, an OS/2-based application server and still be used as an end-user workstation.

"This lets customers take OS/2 2.1 and NetWare 4.01 out of the box, add drivers and start sharing a processor," said Jan Newman, executive vice president of Novell's NetWare systems group, based here.

The two companies are targeting the release primarily to branch offices that are running NetWare 4.01 but also rely on OS/2-based applications. Dave Proctor, vice president of products at IBM's Personal Software Products division in Austin, said customers at large central sites generally rely on dedicated servers with enough clients attached to keep the machine busy. But in branch offices machines often are not fully loaded and customers put a priority on hardware consolidation.

According to Newman, there is about an 8% performance hit with NetWare for OS/2, which users in more demanding environments probably could not afford to take.

Analysts agreed that branch offices will be the most likely candidates to use this software.

"Not much of the world has been holding its breath for NetWare for OS/2," explained Janet Hyland, director of network strategy research for Forrester Research, Inc., a consulting firm

See NetWare for OS/2, *page 24*

SynOptics details plan for high-speed LAN product

BY MAUREEN MOLLOY

Santa Clara, Calif.

SynOptics Communications, Inc. last week announced plans to roll out products that will enable users to build higher performance Ethernets to accommodate growing bandwidth requirements.

The company said it will provide a range of Ethernet switching devices that support both 10M and 100M bit/sec Ethernet ports, including switch modules for its hub line and stand-alone devices.

The 100M bit/sec ports on the new switches will comply with the SynOptics- and 3Com Corp.-backed IEEE standard for Fast Ethernet, which uses Ethernet's carrier-sense multiple access with collision detection access scheme.

3Com last week announced plans to roll out a suite of Fast Ethernet products by mid-1994 that will span its entire product line, from adapter cards to intelligent hubs and routers (*NW*, Aug. 2, page 4).

A competing proposed standard for 100M bit/sec Ethernet — developed by AT&T Microelectronics and Hewlett-Packard Co. — uses a proprietary signaling scheme that calls for a change in the media access control protocol.

In related high-speed networking news, the vendor announced the availability of its LattisCell Asynchronous Transfer Mode (ATM) switch, a 15-port device that supports dedicated 155M bit/sec ATM links across a 5G bit/sec Fast Matrix switching fabric (*NW*, March 1, page 2).

ETHERNET SWITCHING

The new three-port Ethernet switches will incorporate SynOptics' Fast Frame and CelliFrame technologies. The Fast Frame technology, based on five Application Specific Integrated Circuits, will give the switches a total switching capacity of 2G bit/sec and provide support for both 10M and 100M bit/sec Ethernet connections.

This will enable customers to maintain existing 10M bit/sec Ethernet adapter cards while boosting performance signficantly by extending to those end nodes dedicated 10M bit/sec pipes.

The 100M bit/sec Ethernet connec-

See Syn Optics, *page 25*

BRIEFS

The high-end hub market will get a boost this week as **Synernetics, Inc.** is expected to roll out the LANplex 6000, which is a multigigabit switching hub that is designed to take advantage of high-speed networking technologies, including Fiber Distributed Data Interface and Asynchronous Transfer Mode protocols.

To support the higher speeds, the North Billerica, Mass.-based company has incorporated a 3.2G bit/sec backplane as well as Internet Protocol routing capabilities.

The 12-slot LANplex 6000 will be available in October.

Pricing starts at $31,900 for the 12-slot chassis, the System Management and Enterprise Access Module, as well as software for intranetwork routing and Simple Network Management Protocol-based management functions.

Synernetics: (508) 670-5488.

Banyan Systems, Inc. and **NCR Corp.** have announced an NCR WaveLAN wireless local-area network driver for the Banyan VINES network operating system.

WaveLAN driver for VINES is currently available from Banyan for VINES Version 5.52 and will be fully integrated into future VINES releases.

Banyan: (508) 836-1000; NCR: (513) 297-5700.

IBM PC Co. announced OS/2 2.1 support for its Personal System/2 Server 195 and 295 families.

The PS/2 Server 295 is IBM's fault-tolerant server for client/server applications, while the Server 195 is suitable for enterprise file and print services. OS/2 2.1 will be shipped with new PS/2 195 and 295 servers.

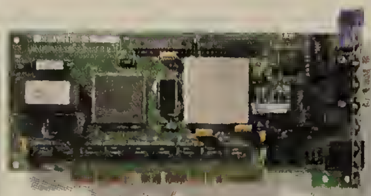
Customers with 295s that have licensed OS/2 1.3 can upgrade to 2.1 free of charge.

In other news, IBM last week introduced the 16/4 ISA-16 Adapter, a 16-bit token-ring card for Industry Standard Architecture-based machines.

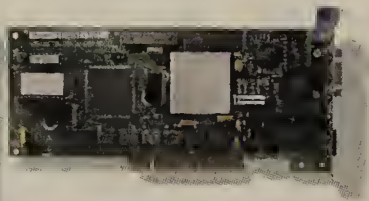
Priced at $505 and available immediately, the card includes on-board filters for both shielded and unshielded twisted-pair cabling.

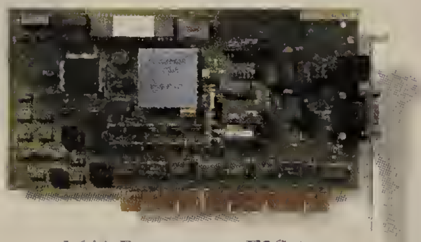
a) Token-Ring

Token-Ring 16/4 Adapter/A (MCA)


LANStreamer MC 32 Adapter

16/4 ISA 16 Adapter


LANStreamer MC 16 Adapter

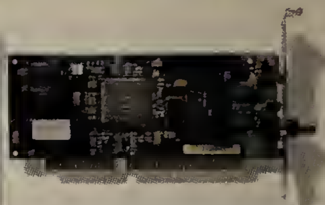

16/4 Busmaster EISA Adapter

b) Ethernet

EtherStreamer MC 32 Adapter (10BaseT/2/5, full duplex mode)

LAN Adapter/A for Ethernet (10BaseT/2/5, MCA)

LAN Adapter for Ethernet TP (10BaseT, ISA)


LAN Adapter for Ethernet CX (10Base2, ISA)

e) All of th

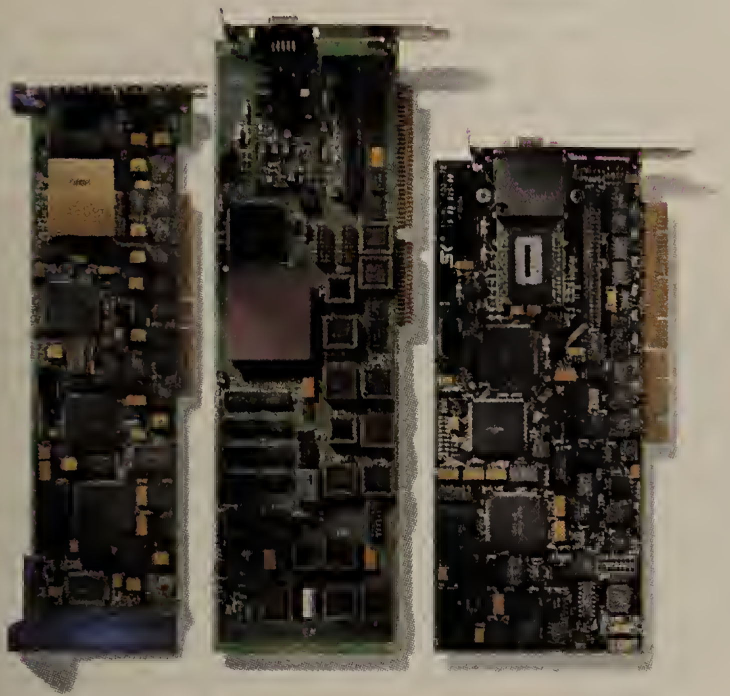
Adapting to the 1990s with IBM

And more. Because if the question is adapter cards, the answer is IBM. These days, all kinds of businesses operate over different kinds of networks and need a variety of LAN adapters. And no one offers a broader array of cost-effective, high-quality adapters than IBM.

We've also been thinking about networks of the future. New CPU power. Multimedia. Databases. Miniaturization. Mobile computing. That's why IBM continues to develop a full line of feature-rich, aggressively priced adapters. Just consider the power and speed of LANStreamer™ and EtherStreamer,™ the first true, 32-bit data-streaming adapters for Token-Ring or Ethernet servers. Or check out our high-performance FDDI adapters for both fiber and

IBM is a registered trademark and LANStreamer and EtherStreamer are trademarks of International Business Machines Corporation. ©1993 IBM Corp

c) FDDI


MCA ISA EISA

FDDI Adapters for fiber and copper with extenders for dual attachment

d) PCMCIA

Credit card adapters for devices with PCMCIA Type II slots

e above

copper media. IBM was also the first to introduce a family of PCMCIA adapters for Token-Ring, Ethernet and 3270 Emulation. And we offer a full line of high-function hub solutions like the IBM 8250 Multiprotocol Intelligent Hubs.

All our adapters are loaded with features, and backed by the kind of service and support you'd expect from a LAN adapter leader. So whether you're building your first LAN, or trying to network your networks, look to IBM for reliable solutions. To order or for more information, call 1 800 IBM-CALL, ext. S82A.

IBM. The multiple choice answer for a multiple choice world.

IBM

[*Making networks work.*]

HIGH-SPEED LANS

ODS expands Infinity hub line with Ethernet switching modules

BY CHRISTINE BURNS

Dallas

Optical Data Systems, Inc. (ODS) last week announced agreements with Artel Communications Corp. and Kalpana, Inc. that will enable it to provide Ethernet switching on its Infinity hub line at two different levels.

The separate deals will result in products that give Infinity users a way to extend dedicated 10M bit/sec network links to bandwidth-hungry devices and a plug-in module that can support concurrent, full-speed links between Ethernet segments supported by the hub.

Infinity comes in four-, seven- and 12-slot versions and contains four Ethernet backplanes, four token-ring backplanes and a single Fiber Distributed Data Interface backplane, with a total backplane capacity of 300M bit/sec in its maximum configuration.

A fully loaded 12-slot Infinity can support as many as 44 Ethernets, 44 token rings and three FDDI rings. ODS has also revealed plans to add a separate backplane to support Asynchronous Transfer Mode.

Through its arrangement with Artel, ODS will offer the Starbridge Turbo eight-port Ethernet switch as a plug-in Infinity module.

The Starbridge uses one slot in the Infinity and offers eight dedicated Ethernet ports, each of which operates at the full 10M bit/sec network speed. The module is Simple Network Management Protocol-compliant and supports twisted pair, thicknet, thinnet and fiber-optic links.

The Starbridge will be available in October and will cost $7,200.

The Kalpana agreement centers on integration of that company's EtherSwitch technology into the Infinity to provide high-speed, efficient links between Ethernet segments and high-performance connections to servers and workstations. This Ethernet switching module, which offers 50M bit/sec of aggregate throughput, uses one slot in the Infinity hub and supports five 10Base-T user ports.

Customers can connect all four of the Ethernet backplanes located in the Infinity via the switch and use the last port to provide a connection to other high-end nets via a bridge or a router.

The EtherSwitch module for the Infinity is available immediately and is priced at $3,995.

©ODS: (214) 234-6400.

Intel to unveil slew of new products

BY CARYN GILLOOLY

Santa Clara, Calif.

Intel Corp. this week is expected to introduce a slew of products that will signal the launch of the company's new Smart Network Services strategy, which will provide integration and interoperability among different LAN products and services.

Intel is expected to roll out new adapters, server-based applications and management software that will work together to provide more secure and easily managed local-area network environments.

Topping off the list are five new adapters, most significant of which is the EtherExpress Flash32 LAN Adapter for servers. This new adapter is an autoconfigurable 32-bit Extended Industry Standard Architecture (EISA) Ethernet card with Intel's FlashStart flash memory.

Flash memory on the card lets administrators load and unload drivers remotely and collect information about what is running. Previously, Intel only offered FlashStart with its EtherExpress ISA line.

"We've expanded the flash capabilities from our client- to our server-based products," said Chris Thomas, manager of technology and alliances at Intel, based here. "Our adapters are getting to be very intelligent entities on the network."

To add even more intelligence, Intel is bringing out FlashWorks 1.5, software that will let administrators add virus protection to any EtherExpress Flash card on the LAN. It will check for boot-sector viruses as the machine is being brought on line and, if a virus is detected, alert the administrator and discontinue the boot process.

A FlashWorks Upgrade Kit will give EtherExpress 16C and EtherExpress 16TP customers the same virus protection.

In addition to the higher end cards, Intel is bringing out two new 16-bit cards that include flash memory — the EtherExpress Flash LAN Adapter and the EtherExpress Flash TP LAN Adapter.

The company is also adding a lifetime warranty to all its adapters, as opposed to a previous three-year warranty.

Intel is also expected to introduce this week new versions of its StorageExpress ELD, XLD and XLE backup servers. The primary enhancement to each is integration with the company's LANDesk Manager LAN management software that will enable the servers to provide event-driven backup rather than simple scheduled backups.

Event-driven backups occur in conjunction with certain alerts or alarms, according to Mark Christensen, operations manager of application server operations at Intel. For example, the administrator can set the StorageExpress server to automatically back up the network server's hard disk when it reaches 90% capacity.

Intel's product parade

Product	Price	Availability
Adapters:		
EtherExpress Flash32 LAN Adapter	$349	Oct.
EtherExpress Flash LAN Adapter	$139	Now
EtherExpress Flash TP LAN Adapter	$139	Now
FlashWorks 1.5	Free	Now
FlashWorks Upgrade Kit	$49 per single kit	Oct.
Server applications:		
StorageExpress ELD 1.2	$7,495	Nov.
StorageExpress XLD 1.2	$9,995	Nov.
StorageExpress XLE 1.2	$13,495	Nov.
NET SatisFAXtion Software 2.5	$995 for 20 users	Sept.
NetPort Express	$799	Oct.
Management software:		
LANDesk Manager 1.5	$1,495 per server	Sept.
LANDesk Response	$995	Sept.

GRAPHIC BY TERRI MITCHELL SOURCE: INTEL CORP., SANTA CLARA, CALIF.

In addition, the new versions of StorageExpress support Novell, Inc.'s NetWare 4.0, provide the ability to restore files directly to workstations and feature automated self-backup.

Also newly tied into LANDesk Manager is Version 2.5 of Intel's NET SatisFAXtion facsimile server software, which will now be able to send alerts to administrators through LANDesk Manager when fax problems occur.

The fax server software includes new client-billing capabilities that enable administrators to bill back users and support for Microsoft Corp. LAN Manager and IBM LAN Server drivers, letting the server operate in either of these environments. Previously, NET SatisFAXtion could ony work within a NetWare environment.

The final addition expected on the server side is a token-ring version of the company's NetPortExpress print server, which was previously only available with Ethernet connections. Intel will offer customers of both the Ethernet and new token-ring versions free software upgrades that give the print servers Apple Computer, Inc. AppleTalk and Transmission Control Protocol/Internet Protocol support, in addition to current NetWare support.

Virtually all of these upgraded products are tied into Intel's LANDesk Manager 1.5 software, designed to manage desktop systems, servers, wires and services on NetWare 3.11 LANs through a single management console.

"LANDesk Manager is the key piece to all this," Thomas said. "We see management as the one service on the network that interacts with all other services."

The new version includes a Server Monitor and software that provides monitoring of 17 different features on a NetWare server, such as disk and memory capacity and number of errors.

LANDesk Manager 1.5 also includes a Network Print Manager to provide statistics on network-attached printers, a Software Probe that can off-load the job of monitoring the network to a dedicated workstation and a Remote Access Module to provide asynchronous communications for remote management.

See chart for pricing and availability.

©Intel: (800) 538-3373.

Microsoft still growing despite troubled market

BY FREDRIC PAUL

Redmond, Wash.

While Apple Computer, Inc. and IBM struggle with huge losses and multibillion-dollar writedowns, Microsoft Corp. continues to enjoy record income and earnings.

Bouyed by its absolute dominance in personal computer-based operating systems — Microsoft sells a million copies a month of Windows 3.1 — and the success of its Windows applications, the company posted its first $1 billion quarter for its fiscal fourth quarter, ended June 30, as well as a 26% growth in net income.

Revenue for the fourth quarter of fiscal 1993 were $1.04 billion, up 27% over $815 million in the same period last year. Net income was $265 million, up from $210 million last year.

For fiscal 1993, the company garnered revenue of $3.75 billion, an increase of 36% from last year, and net income of $953 million, up 35%. The figures represent Microsoft's 18th consecutive year of growth.

Most importantly, perhaps, Microsoft earned an astonishing 25% profit margin, making it one of the most profitable companies of its size in the world. This comes even in the midst of bloody price wars by the companies that make and sell the hardware that run Microsoft software, a situation that is squeezing already slim profit margins.

While impressive, observers are divided as to whether the company can keep up the growth. Microsoft will ship the new Windows NT and Windows NT Advanced Server versions of its operating system this month, which will open up new high-end network markets to a company traditionally focused on individual users. Microsoft hopes Windows NT will provide an entrance into the lucrative networking market that it has so far failed to penetrate with products such as LAN Manager.

But of course Windows NT, and its successors — code-named Chicago and Cairo — will continue to require significant development costs. And despite deals with a number of third parties, properly supporting the network market may severely tax an organization more accustomed to serving end users.

Microsoft may also face pressure from other new operating systems, as Apple joins with Motorola, Inc., IBM and Novell, Inc. to push the Macintosh operating system onto a variety of new platforms.

In addition, Microsoft is beginning to feel the heat of a brewing price battle over PC applications, including an increasing reliance on selling suites of applications which can dramatically lower profit margins. ◼

NetWare for OS/2

Continued from page 21

based in Cambridge, Mass. But there are a handful of companies that have developed their own OS/2 applications for branch offices who want to run these programs on NetWare servers, she said.

Hyland went on to say, however, that she was "disappointed that neither company went so far as to bundle the three parts you have to glue together to make this work." Customers must buy NetWare 4.01, OS/2 2.1 and NetWare for OS/2 separately.

"Novell just rolled out a single-install package with lots of goodies in it," Hyland said, referring to Novell's recent release of its Branch Office product line. "Why didn't they do that for this

NetWare for OS/2 will be available in the middle of this month for $200. ◼

Artisoft

Continued from page 21

and multiplatform support.

On the high end, Artisoft is developing a version of LANtastic that uses dedicated servers and offers increased input/output performance for multiuser database applications. Artisoft will base this NOS on a 32-bit multitasking operating system rather than DOS. This version may offer connectivity to NetWare, Banyan Systems, Inc.'s VINES, IBM's LAN Server and Microsoft's NT, LAN Manager and Windows for Workgroups.

Users identified several other areas they thought Artisoft should improve. They suggested Artisoft move further away from proprietary adapter cards and focus on providing connectivity to host environments and work with software developers to give LANtastic users direct access to applications such as electronic mail. The simplest plug-and-play LANtastic peer networks still require use of Artisoft adapter cards, although other vendors' cards can be used with software drivers supplied by Artisoft separately from the operating system. Dale Bequette, an engineering manager at Poulan/Weed Eater in Shreveport, La., said he believes that Artisoft adapters are slower than other adapters. He runs a LANtastic 5.0 network with over 100 nodes connected to several Unix systems and a Novell NetWare net. Bequette thinks Artisoft should improve the performance of its adapters and lower the price.

"We do everything on this net...and it works just fine," Tim Best said.

Artisoft noted the adapter market's element of competition in the white paper, but said it has no plans to alter its sales strategy. Performance does not seem to be a problem with smaller networks. Tim Best of Best Associates, a corporate headhunting firm in Arlington, Texas, said his nine-node network is pushed to the max. "We do everything on this net from running CDROM and video to integrating it with our phone systems, and it all works just fine," he said.

A second user concern about LANtastic is that it does not offer any connectivity options to host environments. Since one of the target markets for peer networks is remote offices of large corporations, host connectivity is becoming increasingly important. "They're not going to get anywhere without providing a way for the little guys to hook up to a mainframe," said Susanna Opper of Susanna Opper and Associates, a New York and Alford, Mass.-based groupware consulting firm. The First Premier Bank of Sioux Falls, N.D., had to resort to third-party gear to link its 40-node LANtastic net to two IBM and one Unisys Corp. mainframe used to provide updated account and credit card information.

Each host link costs First Premier $5,000 to $10,000. "That's an expensive proposition in the PC world, but at the same time it might be asking a lot of a peer operating system to provide that kind of service," said David Geiver, systems administrator at First Premier.

The white paper indicates Artisoft is considering entering the interconnectivity market with its own bridge and router technology, as well as wide-area network and multiprotocol support.

Users also called for better E-mail capabilities. LANtastic offers users a basic E-mail function and a chat function that allows them to communicate short messages in real-time, but both Best and Geiver said the native E-mail service is not as powerful as other E-mail products on the market. They would like Artisoft to form partnerships with the vendors producing the advanced E-mail applications and port them to the LANtastic environment.

Artisoft's new strategy addresses this concern stating the company is considering strategic partnerships to deliver applications such as E-mail, conferencing, scheduling, modem and fax services to LANtastic users.

SynOptics

Continued from page 21

tions can be used to provide links to highly accessed devices such as servers and routers. A new adapter card is required to connect to the 100M bit/sec Ethernet.

The CelliFrame technology will enable the switches to translate between Ethernet packets coming in over 10M or 100M bit/sec links and 53-byte ATM cells, enabling Ethernet devices to communicate directly with ATM-linked devices.

The CelliFrame translation capability is based on the Sun Microsystems, Inc. ATM host interface segmentation and reassembly chip, and will be available as a daughterboard module on the Ethernet switch module.

The System 3000 switch module and the stand-alone switch will be available early next year.

In addition, SynOptics said it will enhance its Optivity net management software to manage the new switches. Currently, Optivity manages intelligent hubs, bridges and routers.

©SynOptics: (408) 988-2400.

WHY BUY THE BRIDGE

WHEN YOU CAN PAY A TOLL INSTEAD?

Dr. BonD connects your remote offices to file servers or hosts without the need for dedicated lines.

Now you can provide LAN access for remote users easily, economically and transparently with the Dr. BonD™ family of Multi-Access Dial Routers from NEC. Because Dr. BonD utilizes the public telephone network, dial-up connections to and from multiple sites are activated only when remote networking is required, providing Bandwidth on Demand without the high expense of leased lines. What's more, Dr. BonD can provide LAN to LAN routing, integral 10BASE-T hub, local or remote terminal service, remote point of presence, modem pooling–even supplementary bandwidth and disaster recovery back-up for existing dedicated routes. In addition, Dr. BonD's local or remote menu-driven network management system supports SNMP. With the savings Dr. BonD provides, it practically pays its own fare–not to mention what you'll save by *not* buying the bridge.

© 1993 NEC America, Inc.

If you'd like to learn more about Dr. BonD, dial us up at 1-800-222-4NEC or mail this coupon.

Mail to:
NEC America, Inc.
Data Communications Systems Division
Marketing Department
1525 W. Walnut Hill Lane
Irving, TX 75038-3797

Name ____
Title ____
Company ____
Address ____
City ____ State ____ Zip ____
Phone number ( ) ____ 02

Celebrating 30 years in America.

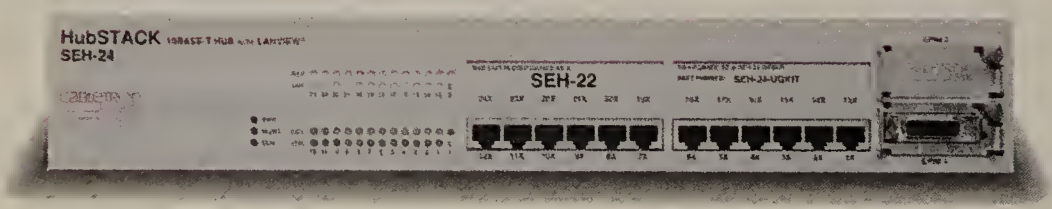
NEC

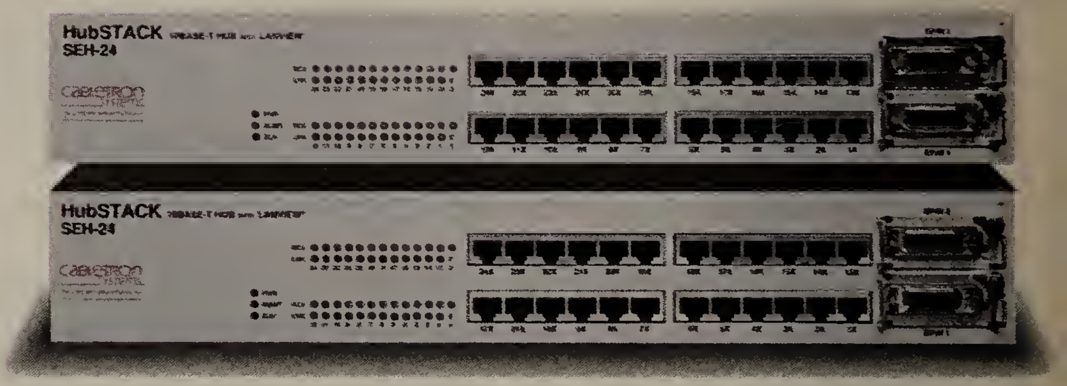
Circle Reader Service #6

LEADER OF

THE HubSTACK.™ STACKABLE ETHERNET

Look Out!
For the Leader Of The Stack
at INTEROP 93 Booth #1026
August 25-27





Economical

When a company like Cabletron Systems designs a stackable hub, it's not interested in following the pack. It's out to lead the pack. That's why our new HubSTACK™ series of Stackable Ethernet Hubs boasts the most sophisticated management found in a stackable hub, and something else: the industry's first modular solution for in-the-hub bridging on *any* standard LAN or WAN! Start with our **economical** SEH-22 for 13 ports of Ethernet connectivity.

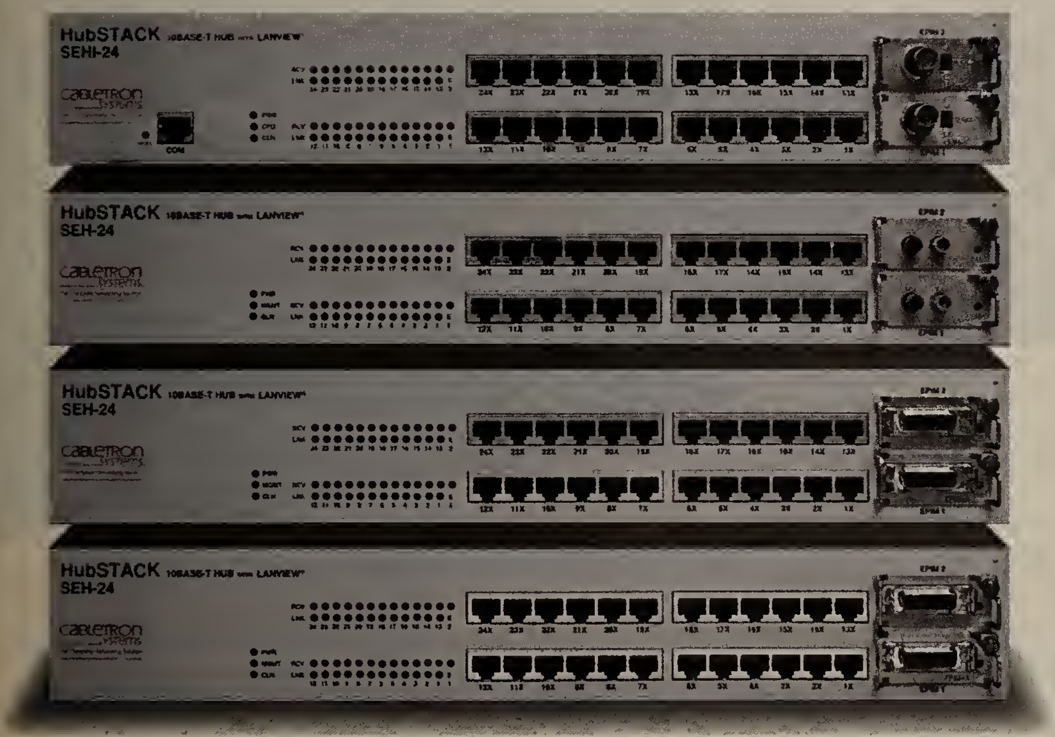
Stackable

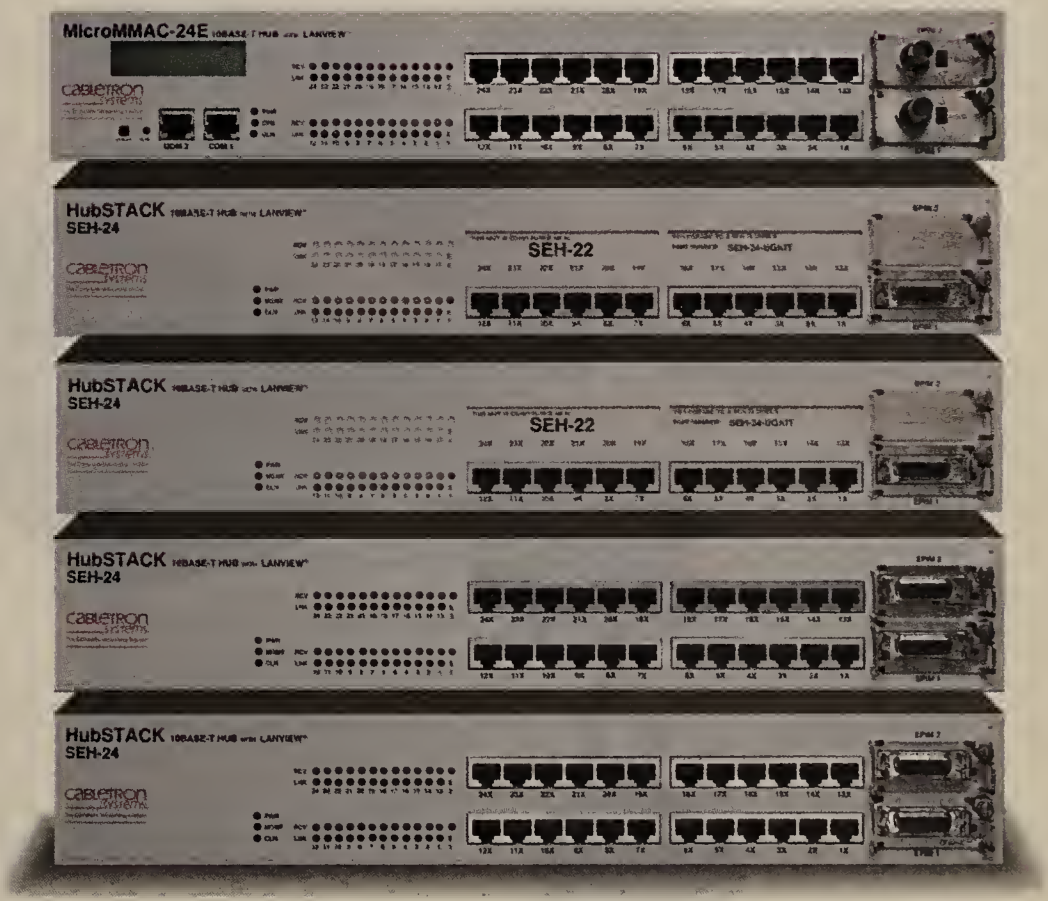
If you need more ports, choose our SEH-24, or upgrade your SEH-22 with a user-installable field upgrade kit . . . and instantly double your port density. Growing out of that solution? Don't worry. SEH stands for **Stackable** Ethernet Hub. When more ports are needed, simply stack on another hub. A total of five hubs can be stacked together to create a single, 130-port Ethernet network with only one repeater hop.

For more information, call: **1-800-HubSTAK.**

THE STACK

HUBS WITH INTEGRATED BRIDGE/ROUTING.





Manageable

Incredible

When you're ready for management, you have a choice. Top off the stack with our low-cost, intelligent SEHI for SNMP and MIB II support. Or choose our powerful, i960-based MicroMMAC and turn your HubSTACK into the most **manageable** remote office solution on the market. The MicroMMAC features advanced SNMP, RMON support and Cabletron's DLM, local polling software for reducing network traffic across the WAN.

When it's time to connect workgroups together, join remote sites to the corporate office, or create high-bandwidth backbones, simply plug in one of Cabletron's new Bridge Router Interface Modules (BRIM) for in-the-hub bridge/routing on Ethernet, token ring, FDDI, ATM, or wide area networks. These **incredible** modules feature all the functionality of a standalone device without the heft . . . or hefty price tag. And because it resides in the hub, the BRIM and the hub are viewed as a single entity by your management system for simple, seamless management.

CABLETRON SYSTEMS Inc.
The Complete Networking Solution™

Corporate Headquarters • 35 Industrial Way • Rochester, NH 03867-0505

Circle Reader Service #15

So what'll it be? A salary freeze? Reduced bonuses? Your company car? Or a new ROLM phone system?

Stumped? We suggest you start with the ROLM phone system.

It's the difference between merely trimming the fat around your company, and turning it into muscle.

Talk to our customers. You'll hear before-after stories that sound like business school case studies. With operators handling four times as many calls per day. Collection agents making six weeks' worth of calls in four days. And abandoned call rates down from 30% to under 1%.

Then there are the infinitely more interesting stories of enormous revenue gains. West Capital Financial Services, for example, pulled in a colossal 357% of their previous year's revenues.

In fact, many of our customers report their ROLM systems have paid for themselves in a matter of months.

Not surprisingly, our customers awarded us the highest overall ratings in the three most recent Customer Satisfaction Surveys conducted by Dataquest®, a leading independent research firm.

It's a tribute to the way we approach your business. We ask questions. We watch the way you work. Then we develop a customized solution that lets you work more productively.

If you would like to receive a free video showing how we've helped a number of businesses work more profitably, give us a call at **1-800-ROLM-123.**

And you can leave all those drastic, cost-cutting morale-squashing measures to someone else. Your competitors, for instance.

ROLM is part of the Siemens family. The world's largest private communication systems manufacturer.

ROLM
A Siemens Company

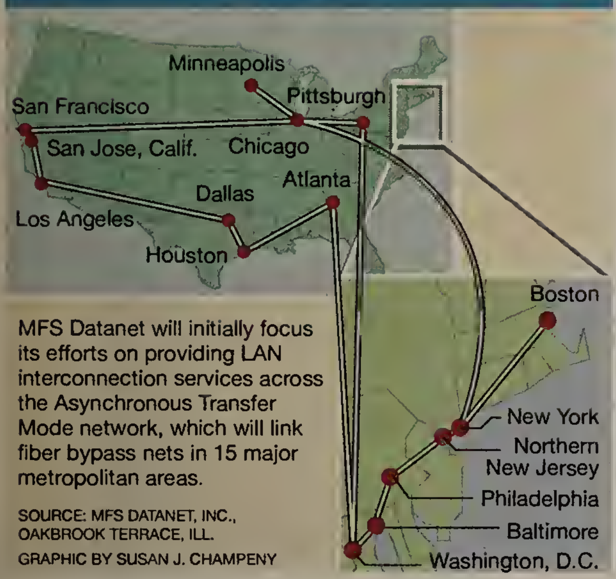
©1993 ROLM.

Circle Reader Service #7

GLOBAL SERVICES

Voice, Data and Wireless Services, Regulatory Issues and Voice CPE

MFS Datanet takes ATM nationwide



MFS Datanet will initially focus its efforts on providing LAN interconnection services across the Asynchronous Transfer Mode network, which will link fiber bypass nets in 15 major metropolitan areas.

SOURCE: MFS DATANET, INC., OAKBROOK TERRACE, ILL.

GRAPHIC BY SUSAN J. CHAMPENY

National net offers ATM, Ethernet links

BY BILL BURCH

MFS Datanet, Inc. last week said it will complete a national Asynchronous Transfer Mode (ATM) net early next month that offers native-mode ATM service and Ethernet LAN interconnection nationwide.

MFS Datanet has been working on the network since last year. By December, the carrier had installed Newbridge Networks, Inc. 36150 Mainstreet ATMNet switches in Boston, Chicago, New York and Washington, D.C. MFS Datanet began field trials in January, and the network became fully operational July 6.

The carrier currently has ATM and Ethernet interconnection service in 10 cities and will have coverage in 15 metropolitan areas when the network is complete early next month (see graphic, this page).

MFS Datanet President Al Fenn is hoping ATM will win converts by offering greater control over net bandwidth, letting users allocate the exact diameter of pipe needed. Other advantages include the ability to aggregate voice, video and data on the same net, as well as efficiencies from using ATM's standard 53-byte cell for local- and wide-area network traffic.

Rob Rich, an analyst at Dataquest, Inc., said MFS Datanet will gain visibility and demonstrate its potential with the ATM service. He believes the ATM move parallels the earlier entry of competitive access providers (CAP) in the special access market. For special access, CAPs used fiber nets to win business from providers using copper nets. In both cases, the carriers are skimming off large business users in urban areas.

One difference this time, however, will be the strength of the competition, Rich said. MFS Datanet will be battling private-line vendors that have been fighting for market share for the past 10 years. With those vendors determined to keep current customers, MFS Datanet will have a hard time luring away users, he said.

MFS Datanet has signed up Bear, Stearns & Company, Inc. as an ATM customer and is setting up a metropolitan-area net for the financial firm in New York. Bear, Stearns plans to run voice, data and video over the ATM net for such applications as trading and transaction processing, according to Jeff Marshall, the

See MFS, *page 35*

Battle brews over new numbering plan

Bellcore proposal could cost users $1 billion.

BY ANITA TAFF

As much as $1 billion of users' money may be riding on the outcome of a battle over how to restructure the nation's telephone numbering system.

The battle is an outgrowth of soaring telephone network usage, which has virtually exhausted the nation's area-code numbering system.

The aging numbering system, implemented in 1951, is currently being revamped by officials at telephone companies and Bell Communications Research, the research arm of the Bells.

The part of the Bellcore proposal causing controversy is the suggestion to eliminate the long-standing practice of dialing 1 for toll calls within an area code to distinguish them from free local calls.

MOIR

Since an area code generally does not need to be dialed for calls within the same area, users would have no way to distinguish between the two types of calls.

Although the Bellcore proposal may not sound radical, a coalition of some of the largest users and consumer groups in the country say it could cost them as much as $1 billion. These cost projections are based on a report prepared by the British Office of Telecommunications, which estimated what similar numbering changes would cost users in the U.K.

These costs come primarily from two areas. First, telecommunications managers will no longer have a convenient way to program private branch exchanges to restrict certain employees from making toll calls within the home

See Numbering plan, *page 35*

AT&T gives users 'Maximum Advantage'

BY BOB WALLACE

Following MCI Communications Corp.'s lead, AT&T last week announced a program designed to help users reduce calling costs by using the best mix of calling services and discount plans.

With the program, dubbed Maximum Advantage, AT&T sends a single-page customized statement every quarter that compares customers' current AT&T service charges and related discounts with other similar AT&T network services.

If a less expensive AT&T service could have been employed, the carrier credits the user for the difference.

Maximum Advantage statements will also make recommendations for the most appropriate service to meet users' needs based on their calling patterns and traffic volume. Statements will detail optional term plans, discounts on calls to specific countries, toll fraud services, billing and direct connection options that further cut costs.

AT&T will provide the statements free of charge to companies that spend more than $2,000 per month on one or more of its 800, WATS or regular long-distance services.

The carrier said the first statements, which will be issued in November, will only list recommendations based on users' calling plans and traffic during May. Subsequent statements will pick up from that point until the carrier is up to date.

The announcement of AT&T's Maximum Advantage offering comes on the heels of MCI's Proof Positive program, which was introduced in late June.

Under Proof Positive, MCI delivers three sets of statements every 90 days. The first "proves" that MCI services are less expensive than comparable AT&T offerings, while another details any MCI service that can save the user additional money. With the third, MCI shows the customer in writing when and how it can make changes to reduce communications costs.

Like AT&T's plan, Proof Positive credits the user the difference if the company could have saved more by using another MCI service.

"These programs partially eliminate the need for users to pick the right service because the carriers will give you the lowest price," said Bob Self, president of Market Dynamics, a New York tariff analysis firm. "But users must realize that getting the lowest price probably means signing a term plan, and not all users want to sign a long-term contract."

Daniel Briere, president of TeleChoice, Inc., a Montclair, N.J., consultancy, agreed.

"The carriers' service plans are so confusing that many users don't know if they're on the right service," he said. "And with the new programs, a carrier can take away the price issue — the biggest angle in selling services."

©AT&T: (908) 221-2000; MCI: (202) 872-1600.

BRIEFS

Southwestern Bell Mobile Systems is launching in 10 cities a digital cellular service for voice calls in what it is billing as the largest deployment of the service in North America.

The carrier has deployed the service in Chicago and plans to provide it in Dallas and St. Louis next month and in Boston and Washington, D.C. by December.

Southwestern Bell Mobile Systems will also roll out digital cellular service in Midland, Odessa, Abilene, Amarillo and Lubbock, Texas, by the first quarter of 1994, according to a spokesman for the carrier.

The announcement comes on the heels of Southwestern Bell Mobile Systems' best quarter ever in terms of new customers. The company added 130,000 customers in the second quarter of 1993 to boost its customer base to a total of 1,643,000 users.

The Southern Co. has announced plans to form a new subsidiary — **Southern Communications Services, Inc.** — to provide wireless communications services for its five electric utility subsidiaries and market the excess capacity to others in the states those utilities serve.

The new subsidiary, which is subject to government regulatory approval, will develop a digital wireless communications network to improve service to utility customers, enhance communications for government agencies and hold down communications costs.

The Southern Co. is the parent firm of Alabama Power Co., Georgia Power Co., Gulf Power Co., Mississippi Power Co. and Savannah Electric & Power Co.

The new mobile radio communications system, scheduled for service beginning in 1994, will cover Alabama and Georgia as well as portions of Florida and Mississippi.

The first meeting of the **Electronic Communications Service Provider Committee** of the Exchange Carriers Standards Association (ECSA) will be held Aug. 31-Sept. 1 in Hoffmann Estates, Ill., with law enforcement agencies to address network issues associ-

See Briefs, *page 34*

THE COMPAQ UL FOR BRIGHTER BRIGHT

Compaq UltraView Active Matrix Screen

Tired of everything looking dingy and gray? Embarrassed by dull whites and faded blacks? Try UltraView. The exclusive screen of the LTE Lite 4/25E. It's the only black and white active matrix VGA screen on the market. And the brightest, highest-contrast screen available. So it

© 1993 Compaq Computer Corporation. All Rights Reserved. Compaq Registered U.S. Patent and Trademark Office. UltraView and LTE are trademarks of the Compaq Computer Corporation. The Intel Inside L

TRAVIEW SCREEN.
S AND WHITER WHITES.

Competitor's Passive Matrix Screen (screens not retouched)

separates whites from blacks and keeps them looking sharp. And for a limited time, you can call 1-800-PREBATE, ext. 850 and receive a check worth up to $250 on every purchase of an LTE Lite. Which means the best reason not to wait for a color screen is right here in black and white. COMPAQ

ademark of Intel Corporation. Paint Shop Pro provided by Jasc Inc. PREBATE offer available in the U.S. through 9/30/93. Not valid with other Compaq products or promotional offers or through Compaq DirectPlus.

Circle Reader Service #14

Carrier launches service aimed at single-site firms

BY BOB WALLACE

Vienna, Va.

Cable & Wireless Communications, Inc. last week detailed two new calling services designed for single-site firms that currently spend more than $175 a month on long distance.

The new services, Simplicity and Simplicity Direct, were developed for firms that currently use switched outbound, 800, conference calling and calling card services.

Gabe Battista, chief operating officer for Cable & Wireless, estimated that 99% of all small businesses and 60% of all midsize businesses operate from a single location.

With Simplicity, firms use switched access to the Cable & Wireless long-distance network, while companies that subscribe to Simplicity Direct use dedicated access.

Service features include consolidated billing, which eliminates the need for users to review multiple bills and manually cross-reference costs that must be charged to individual end users or departments.

Pricing for outbound and 800 interstate calls under Simplicity is $.2250 per minute to locations less than 100 miles away and $.2475 per minute to sites beyond that limit.

Users are eligible for a monthly 5% discount on calls for the area code where the customer does the most business. Also, users receive a 15% discount for the region they deem most important to their business. After assessing those discounts, the carrier then applies a 10% volume discount to service usage between $175 and $1,499.99 and a 15% volume discount for usage totaling more than $1,500. Term plan discounts also apply (see graphic).

Cable & Wireless also offers a 20% off-peak discount on calls made between 5 p.m. and 8 a.m. weekdays and on calls made during the weekend.

Pricing for outbound calls under Simplicity Direct is $.1300 per minute to sites less than 100 miles away and $.1560 per minute for longer distances. Toll-free service calls made to any destination cost $.1560 per minute.

Cable & Wireless applies a 10% volume discount to service usage totaling between $1,000 and $4,999.99, a 12% discount for usage between $5,000 and $9,999.99 and a 15% discount for usage totaling $10,000 or more.

©Cable & Wireless: (703) 790-5300.

Simplicity services, terms, plans and discounts

Simplicity	Contract length/Discount		
Minimum monthly usage	1 year	2 years	3 years
$250	5%	7%	8%
$1,000	7%	10%	15%

Simplicity Direct	Contract length/Discount		
Minimum monthly usage	1 year	2 years	3 years
$2,000	6%	8%	10%
$4,000	8%	11%	14%
$10,000	10%	12%	15%

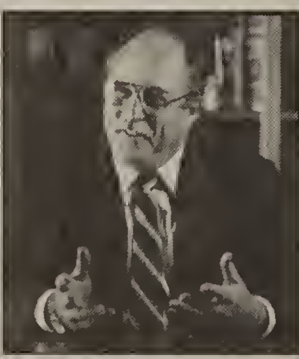
SOURCE: CABLE & WIRELESS COMMUNICATIONS, INC., VIENNA, VA.
GRAPHIC BY SUSAN J. CHAMPENEY

Metricom eyes new wireless markets with RF-based services

BY ELLEN MESSMER

Los Gatos, Calif.

Metricom, Inc. is moving into ARDIS Co. and RAM Mobile Data, Inc. turf with a new service offering based on its radio frequency (RF) network equipment that now supports higher speed local-area network access.



DILWORTH

The company last month installed its Utilinet radio base station equipment at Apple Computer, Inc.'s Cupertino, Calif., headquarters, enabling Apple employees carrying laptops outfitted with Metricom wireless modems to dial in to the company's internal AppleTalk network as they move about the area. Apple is paying Metricom a monthly, usage-based fee for the equipment rather than purchasing it outright.

Metricom believes that the radio equipment's 56K bit/sec data throughput rate – high for RF systems – makes its service a viable alternative to RAM Mobile Data's and ARDIS' offerings.

"This company is beginning to provide regional wireless network communications significantly better and cheaper than RAM or ARDIS is," said Robert Dilworth, president and chief executive officer of Metricom.

The Metricom spread-spectrum base station equipment operates on the so-called Industrial, Scientific and Medical (ISM) bands between 902 MHz and 928 MHz, which require no Federal Communications Commission license. The base stations, which support as many as 200 users, are priced at $700 each. Alternatively, the company has set a monthly charge of $2.95 per user for a 2.4K bit/sec connection, $9.95 for 14.4K and $19.95 for 56K.

WIDESPREAD MARKET

With its traditional market being the power industry, Metricom counts more than 19 electric utilities in the U.S. using its meshed networks to monitor power lines, electric meters and transformers. Among its customers are Pacific Gas & Electric Co., Southern California Edison Co. and Boston Edison Co.

But when Metricom found it could adapt the Utilinet product from the low speed of 9.6K up to 56K bit/sec and add LAN protocol support, it decided to venture into new markets.

Metricom has added support for the AppleTalk protocol to Utilinet and hopes to soon include drivers for the Transmission Control Protocol/Internet Protocol, as well. It previously supported only proprietary protocols used by the utility industry.

However, use of the ISM bands imposes limitations that vary according to the user's site. The ISM bands could support a 10-mile hop between Metricom cell sites outdoors while only allowing a one-mile distance from inside to outside. In-house, the ISM bands might only support up to 50 feet in some circumstances, Dilworth acknowledged.

But he predicted that Metricom's wireless networks, which use simple Hayes Microcomputer Products, Inc. modem commands, will appeal to universities, where lack of available phone lines often hinders students' ability to dial out from computers to such networks as CompuServe and the Internet. Sources said Metricom will install a net for Stanford University later this year. ◘

WIRELESS

ARDIS ups net speeds, readies roaming feature

BY ELLEN MESSMER

Lexington, Ky.

ARDIS Co. has set out to quadruple the capacity of its packet-data radio network in the top 15 metropolitan areas in the country and is planning to implement nationwide roaming by September.

The quadrupling of the network channel rate from 4.8K to 19.2K bit/sec will give ARDIS more channels to support a larger number of customers in cities where its network is heavily loaded.

This September, ARDIS will also implement nationwide "roaming" so users traveling from one location to another will not have to preregister their device to work in the new location.

BERGER

By December, ARDIS will have Los Angeles, New York and Washington, D.C. up at 19.2K bit/sec, with 12 additional cities to follow by the end of 1994. ARDIS handles 7,000 messages per hour from 32,000 subscriber units in the field and 300 customer host computers.

"We're adding 19.2K bit/sec, so our capacity increase will be four to eight times greater [than present]," said Tom Berger, ARDIS' vice president of the radio network and product technology. The lack of available radio spectrum has forced ARDIS to cut deals with users – such as the sheriff's office in New York – to add radio capacity where needed.

"We have made the commitment to customers that we will not obsolete their equipment ."

RAM Mobile Data, Inc., an ARDIS rival, doesn't have this problem, Berger noted. "They've already bought up their channels from users and got Federal Communications Commission permission to wait five years to load them," he noted.

To use ARDIS' service in 19.2K bit/sec areas, customers need new modems. Current ARDIS users with Motorola, Inc. 4.8K bit/sec InfoTAC wireless modems will get a free upgrade to a dual-speed device that supports both 4.8K and 19.2K bit/sec.

"We have made the commitment to customers that we will not obsolete the equipment they have," Berger said.

ARDIS customers Pitney-Bowes, Inc. and NCR Corp. are beta users for Motorola's 19.2K bit/sec devices, expected to be shipped in the fourth quarter. But Motorola already missed its July shipping date on the InfoTAC upgrade, and the company acknowledges it is having trouble working out the bugs.

Besides the boost in speed, the ARDIS network upgrade – to be completed by September – will let users with ARDIS-capable devices roam from one region to another. This will overcome a deficiency that ARDIS admits has probably cost it business.

"Before, you would have to preregister for roaming in 400 regional service areas," said Rodney Hilton, manager of connectivity for ARDIS. The inconvenience of having to call the ARDIS Help Desk to preregister when traveling to new regional areas dissuaded some users.

ARDIS rival RAM Mobile Data has had roaming from the beginning, noted Roberta Wiggins, an analyst with The Yankee Group consultancy in Boston. "It was part of their original architecture," said Wiggins. "ARDIS did not [so] they had to implement new hardware and software."

The nationwide roaming system will be "frequency agile," so devices that are 19.2K bit/sec-capable will automatically adapt to the 4.8K bit/sec speed in other areas.

Another major upgrade ARDIS is planning is the expansion of its gateway system. The company, which supports several gateways and protocol translation capabilities for land-line systems today, will add a variety of radio frequency-based systems early next year.

Existing gateways supported by the network – which comprises 1,300 radio base stations that feed into a digital land-line network with 200 points of presence – provide translation for LU 6.2, LU 2, LU 0, X.25 and X.400 to several public electronic mail systems.

ARDIS is developing a complementary radio network gateway, called the ARDIS Service Engine, that will add support for the RAM Mobile Data protocol, Cellular Digital Packet Data, and even satellite-based services.

"The engine will allow us to connect to other platforms – satellite, cellular and mobile," Hilton said.

In addition, ARDIS wants to be able to extend its ARDISNet management system to customers. Next year, ARDIS will offer the ARDISNet monitoring features, according to Richard Crawford, manager of network support for the company.

ARDIS has widened its reach to users by signing an agreement for interconnection with RadioMail Corp., the wide-area wireless service provider that connects users of several wireless services, including paging networks, to electronic mail services and local-area networks (see story, page 34). ◘

▼ Total Outsourcing ▼ Private Lines ▼ Data Communications Equipment ▼ PBX Equipment ▼ LAN-WAN Network Configuration ▼ Videoconferencing ▼

Custom Analysis and Troubleshooting ▼ Broadcast-Quality Television Transmission ▼ LAN-WAN Network Configuration ▼ Videoconferencing ▼ Network Management Systems ▼ Switched Services

YOU'RE TIRED. FED UP. AND JUST PLAIN AT&TEED OFF.

SO TELL THE BIG GUYS YOU'RE LEAVING THEM FOR WILTEL.

At WilTel®, we've got what they've got, without the attitude problem. It's called WilPower®, and it's everything you need – or only the part you need – for total business telecommunications solutions:

• Nationwide fiber-optic network for voice, data, video and broadcast. • Premises equipment from PBX and intelligent concentrators to routers and multiplexers. • Customized LAN-to-WAN integration and operation. • Expert outsourcing from interim project managers to full-time network engineers.

So call WilTel and get WilPower. Oh, and the lower blood pressure is standard equipment with any purchase.

©1993 WilTel

WILTEL.
Turns Up Everything
1-800-364-5113
P.O. Box 21348
Tulsa, Oklahoma 74121

Custom Analysis and Troubleshooting ◀ Frame Relay Service ◀ Voice Processing Systems ◀ LAN-to-WAN Integration ◀ Data Communications Equipment ◀ Switched Services ◀ Bandwidth-on-Command

▲ LAN-to-WAN Integration ▲ Frame Relay Service ▲ Private Lines ▲ Broadcast-Quality Television Transmission ▲ Collocation Services ▲ Key Systems ▲

RadioMail gateway service will soon get fax support

BY ELLEN MESSMER

San Mateo, Calif.

RadioMail Corp., provider of a service that bridges wireless and wireline electronic messaging and paging networks, will be adding support for wireless-to-facsimile capabilities by the end of the summer.

Users of the RadioMail service will be able to send faxes over more than a dozen two-way radio- and wireline-based messaging services tied into the RadioMail connectivity hub. The fax service is the latest enhancement to RadioMail, launched five years ago by software engineer Geoff Goodfellow to tie wireless paging to the Internet.

RadioMail supports the transmission of messages among a half-dozen paging services, a dozen X.400-based electronic mail services, bulletin boards, the Internet, value-added networks and RAM Mobile Data, Inc.'s radio network. Pricing for unlimited usage is $89 per month.

GOODFELLOW

ARDIS Co.'s Lexington, Ky.-based wireless two-way packet data network will become the latest addition to the RadioMail lineup, but service to the ARDIS net will not be available until Motorola, Inc. gets the bugs out of its new ARDIS modem (see story, page 32). In another new offering, called NewsFactory, RadioMail is distributing information from 16 wire services at no extra charge.

RadioMail now counts about 1,500 users of its gateway service, with Chevron Oil Corp., the U.S. divisions of Swiss Bank and Southern California Edison on the roster of corporate subscribers. Sales personnel, field service representatives and executives can send and access messages on both hand-held wireless devices and computers equipped with RadioMail client software.

Jim Opfer, an independent telecommunications consultant, said he forwards all incoming MCI Mail messages to RadioMail, which, in turn, hands them off to RAM Mobile Data. That enables Opfer to pick up his messages wherever he is.

"I live off RadioMail," he said. "It is not a techie toy. It allows your messages to find you."

Goodfellow, RadioMail's founder and chairman, said the irony is that he never really intended to make a business out of connecting wireless and wireline services.

"I didn't want to get into this business at all," Goodfellow admitted. "I just wanted to be a subscriber [to a service like it]. I was involved in packet radio in the early days. But I ended up having to do the technology to make it seamless."

RadioMail is watching how carriers follow through on their much-ballyhooed plans for Cellular Digital Packet Data. "As soon as it exists, we'll plug into it," Goodfellow said.

After making ISDN a business standard in Europe, we're reaching for the stars.

France Telecom brings the world closer with ISDN.

While many companies are still touting ISDN as the next great communications revolution, France Telecom has been quietly linking together the European business community.

Everyone, from small retailers to the largest banks, has made this simple, high performance vehicle a regular part of doing business.

Today, all the benefits of France Telecom's Transatlantic ISDN are available in the U.S. That means pure, clear voices, digitally transmitted over land and sea for high quality audio conferencing and remote radio broadcasts. High-resolution images for optical scanning, photo composition, faxing, and full-motion videoconferencing. Streamlined data retrieval, file transfer, electronic filing, disaster recovery, data back-up, and LAN interconnection. Transatlantic ISDN gives you the capacity you need on demand.

And because it's usage-based, it can save you a lot of money.

To learn more about the practical advantages of Transatlantic ISDN, call Manuel Barbero at 212-332-2100.

Don't let anyone tell you that ISDN is the wave of the future.

Because you can have it today.

France Telecom

Circle Reader Service #5

BRIEFS

Continued from page 29

ated with electronic surveillance.

The closed-door meeting may be attended by service and equipment providers willing to sign a nondisclosure agreement.

ESCA: (202) 434-8822.

The New Republic and The Internet Co. have formed a joint venture called the **Electronic Newstand**, which will take requests for subscriptions to magazines, including *The Economist* and *The New Yorker*, over the Internet.

The service will also allow users to download selected articles in current issues for Electronic Newstand "browsing."

For information, use Telnet to gopher.netsys.com and log on under enews.

In addition, the Electronic Newstand service will contain advertising on consumer products located in files for downloading.

Infonet Services Corp. has introduced a communications facility in Moscow in order to provide the Moscow business community with access to global data and electronic mail transmissions, as well as high-speed local- and wide-area network connections.

The various services are marketed under the name Infocom, which is a joint venture of Infonet, the Russian Institute for Automated Systems, the Moscow Local Telephone Network and Finnish companies Fexima, Elorg-Data and Telecom Finland.

Numbering plan

Continued from page 29

area code. Second, PBXs will have to be upgraded in order to implement new methods of call restriction. And if older PBXs cannot be upgraded, they will have to be scrapped, according to the user groups.

The coalition of users consists of the Ad Hoc Telecommunications Users Committee; the International Communications Association (ICA); the Tele-Communications Association, Inc.; the California Bankers Clearing House Association; MasterCard International, Inc.; the New York Clearing House Association; the Securities Industry Association; the Consumer Federation of America; the Information Technology Association; the County of Los Angeles and the New York Consumer Protection Board.

In May, the coalition sent an emergency petition to the Federal Communications Commission asking that the agency open a public hearing on these issues, but so far, the FCC has not acted.Peyton Wynns, chief of the FCC's Industry Analysis Division, said part of the reason for inaction is the FCC fears running afoul of state regulators if it steps into the fray.

The proposal affects dialing in local areas and, therefore, may be viewed by state regulators as a local matter, he said.

Wynns added that the FCC would take its cue from the National Association of Regulatory Utility Commissioners (NARUC), a group of the nation's state regulators. The group could not muster a consensus on the issue at its meeting last month and tabled further discussion until its next meeting in November, leaving the issue in the FCC's hands.

One reason NARUC may have been unable to decide how to proceed is that the country's system for handling numbering issues is not uniform.

Some states, including New Jersey, Vermont, and parts of New York and California, have already eliminated using 1 as a toll indicator for intra-area code calls and spent significant sums of money to make the changes, according to a source familiar with the NARUC vote.

"It would be nice to have similar dialing patterns throughout the country, but that means someone has to change the way they do things," Wynns said.

But the coalition of users continues to press the FCC for action. "It does make it easier for users to configure their PBXs if numbering is handled the same way all over the country," said Brian Moir, counsel for the ICA. "If the FCC continues with the Bellcore proposal, it will be more time-consuming and difficult for users," he said.

Whatever happens, the users say that at the very least, they deserve a public hearing and a chance to air their concerns. "It is unconscionable for the agency to sit on this," said James Blaszak, counsel for the Ad Hoc Committee. "If there are going to be problems for users [because of numbering changes], then let's at least get a public hearing."

The FCC must act soon because time is running out, according to Blaszak. The new dialing pattern will be implemented in 1995, the same time as the beginning of Bellcore's new numbering plan, which will add 640 new area codes. "Users will have to start doing something by the middle of next year at the latest" to accommodate the changes in their PBXs, he added.

MFS

Continued from page 29

firm's senior managing director of communications. The company is already operating its own ATM network in New York and may upgrade the net's transport layer to Synchronous Optical Network. But before laying out the money for that upgrade, Marshall says he wants to try an external supplier for network service.

FENN

For its 45M bit/sec ATM service, MFS Datanet is charging $8,000 per site per month; for 10M bit/sec Ethernet LAN inteconnection over the ATM net, the charges fall to $2,000 per port per month. Installation costs $1,000 per month. The service will be offered under individual contracts, and MFS Datanet will offer discounts based on the number of sites and contract length.

MFS Datanet plans to create a fully meshed ATM network using different models of the Newbridge 36150 switch, which can be configured to support from four to 16 ports each. The carrier is testing compatibility between the 36150 and switches from Hitachi America, Ltd. and Bolt Beranek and Newman, Inc. in case the carrier needs to interconnect with those switches in other companies' networks.

MFS Datanet is using DS3 lines from WilTel for long-haul links, putting it in the awkward position of relying on a future ATM service rival for long-distance transport. Such a conflict is practically inevitable because any carrier with a national fiber network is going to be at least considering using ATM.

© MFS Datanet: (408) 975-2200.

ONE FREE MONTH OF CALLS.
PLEASE CONTROL YOURSELVES.

Get the AT&T Corporate Calling Card and get up to 1 month of free* calls.

When your company gets the AT&T Corporate Calling Card, there's no question who's in control. You'll be able to manage out-of-office calling with a variety of competitive savings plans, customized billing and enhanced fraud protection. We've even squeezed in one month of free calls when you sign up now.*

*Pending tariff effectiveness. Discounts apply to your interstate and international calling card usage. New and other eligible customers who subscribe to the SelectValue℠ Plan for twelve months will receive credits in 7th and 13th months based on average qualified usage. Maximum credit of $50,000. Other conditions apply. Limited time for free month offer.

Circle Reader Service #2

Save even more – up to 34% with the new AT&T SelectValue℠ Plan.

With the new SelectValue℠ Plan, you'll get sub-minute timing, discounted service charges and a simplified rate schedule that can save you up to 34% on virtually every out-of-office call made.

Gain real control over card usage with AT&T Card Protect℠ Service. It helps prevent unauthorized use by offering a range of measures such as geographic restrictions, purchase limits and account passwords so you can avoid having to pay for calls your employees didn't make.

Save time, too, with AT&T Card EXECU-BILL℠ Service. Track charges at a glance with a bill organized to best suit your needs.

Find out how the AT&T Corporate Calling Card can be a perfect fit with your company. To be eligible for up to one free month of calls and savings of up to 34%, call your AT&T Account Executive or **1 800 952-1253.**

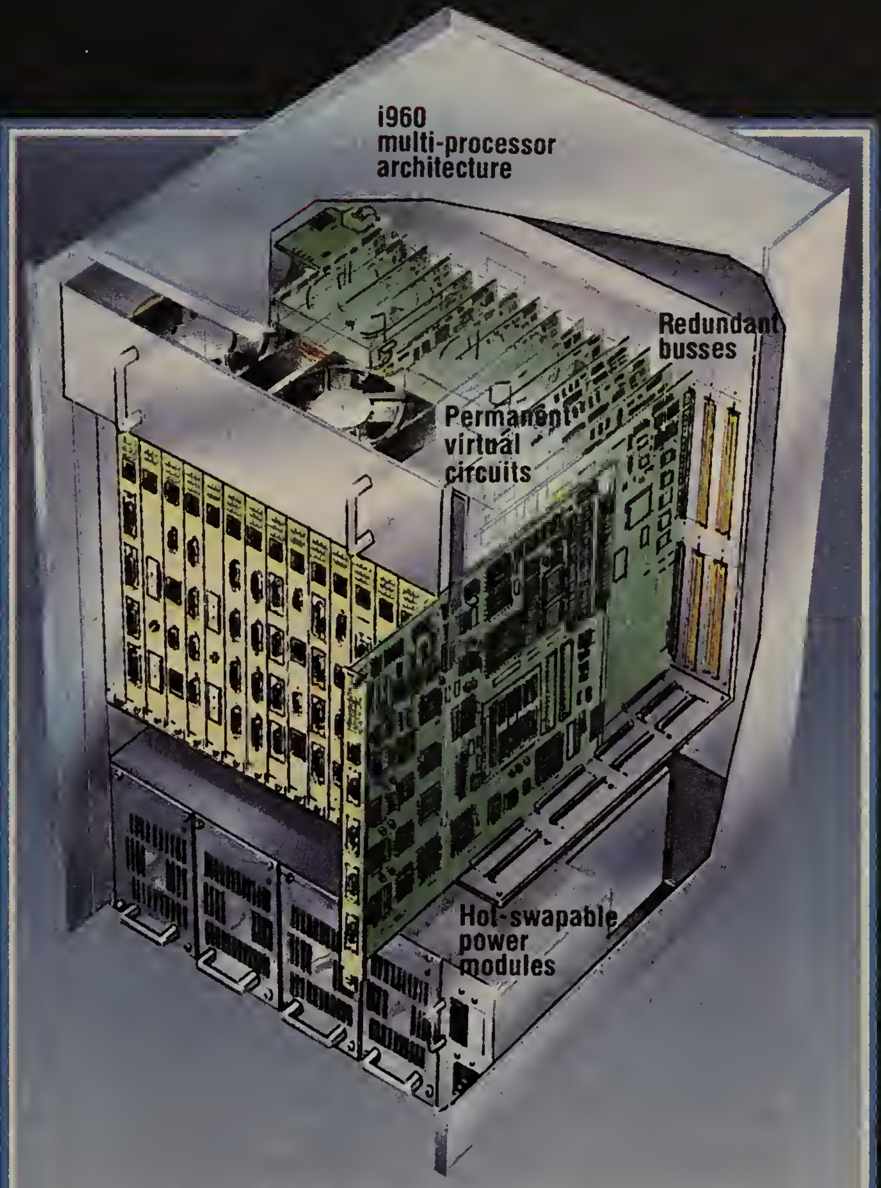
AT&T. The Best in the Business.℠

AT&T

ASCOM
TIMEPLEX
INTRODUCES
GROWTH
WITHOUT
CHAOS

INTRODUCING THE NEXT GENERATION SWITCHING ROUTER. TRULY SCALABLE, MIGRATABLE, AND BACKED BY THE ACKNOWLEDGED LEADERS IN GLOBAL SERVICE.

GROWTH IS NOT NECESSARILY CHAOTIC. YOU CAN PREDICT IT, ADAPT TO IT, MANAGE IT. BUT, LET'S FACE IT, YOU'LL NEED A BETTER ROUTER.


i960 multi-processor architecture
Redundant busses
Permanent virtual circuits
Hot-swapable power modules

THE ASCOM TIMEPLEX ENTERPRISE ROUTER

Growth Without Chaos: Fully scalable in performance and cost./ Consistent, predictable performance for Legacy and LAN traffic./ Network-wide bandwidth priority management./ High performance data link layer switching. Support for every major protocol./ The full potential of frame relay and ATM.

ASCOM TIMEPLEX HAS JUST INTRODUCED THAT ROUTER. IT'S THE NEW ENTERPRISE ROUTER. SEE IT AT INTEROP BOOTH 925.

ascom Timeplex
Masters of Enterprise Networking

Circle Reader Service #4

For further information, please call (800) 669-2298.

i960 is a registered trademark of Intel

At Chipcom,® switching technology isn't just hot this year.

It's been hot for quite some time.

In fact, we've pioneered it from the beginning.

For most of the time they've been in business, other network hub makers have built simple connectivity devices for departmental LANs.

But Chipcom got its start in the brutal environment of the factory floor. Big factory floors. From our very beginning, we created the equipment needed to reliably hold together large, mission-critical networks for big companies.

We realized very early in the game that building a vast network was one thing: Controlling it was another. And we also recognized that as entire enterprises became networked, the problem would become even more critical.

Which is why we were the first to turn to switching, and why we have been the leaders in switching technology ever since. Whether a particular application requires modular, bank, port or segment-switching, Chipcom has the solution. And as ATM looms ever closer, Chipcom's cell-switching abilities will be ready for it.

See us at Interop. Booth #1926

Chipcom switching technology makes true enterprise networking a reality.

No other maker of intelligent hubs offers you the vast array of switching capabilities that Chipcom delivers.

No other line of hubs gives you the ability to engineer an enterprise-wide network with the rock-solid reliability, ease of management and control, and flexibility to handle continued change and growth as Chipcom does. And because our roots were planted in the world of big, far-flung networking, our underlying architecture has always assumed bigness. So you never have to scrap your earlier Chipcom investment as you grow.

When you're thinking big, you should be thinking Chipcom.

When a well-known retailer with over 2,000 stores decided to network their entire operation, they chose Chipcom. A large petrochemical company with refineries in six western states made the same choice. A major insurance company with thousands of offices across the U.S. investigated every hub makers' products before they selected Chipcom.

Hundreds of manufacturing companies, financial institutions, universities and government agencies have learned that if you're building a small network, you have a number of choices. But if you're thinking big, there's only one: Chipcom.

To learn what Chipcom switching technology can do for your organization, call **1-800-228-9930** and ask for your free copy of *Network Switching Solutions*. After all, if you're smart enough to realize what switching can do for your organization, you're smart enough to want to talk to the people who pioneered it.

Network
Switching
Solutions

CHIPCOM

GS00K93AGS6439

Chipcom is a registered trademark of Chipcom Corporation.

© 1993 Chipcom Corporation, Southborough Office Park, 118 Turnpike Road, Southborough, MA 01772

Circle Reader Service #13

CLIENT/SERVER APPLICATIONS

Distributed Databases, Messaging, Groupware, Imaging and Multimedia

Environmental concerns spur largest electronic index system

Net will make global change data more accessible.

BY PETER LISKER

New York

Increased awareness of the tenuous nature of the earth's environment has led to an explosion of interest on the part of both the scientific community and the general public in information about the physical state of the world.

Computer scientists at the Polytechnic University of New York are now creating what may become the world's largest electronic index card system to let researchers locate data and documents about global change from almost anywhere in the world.

At the heart of the system is a complex arrangement of distributed database servers linked via a Transmission Control Protocol/Internet Protocol network that will support a new Distributed Query System (DQS). The DQS features a powerful X/Motif graphical user interface (GUI) to make accessing and navigating through the massive amounts of data intuitive and easy.

Hiromitsu Shiotsuki and Ted Kapela

"Our work anticipates programs that will be in place before the end of the decade generating a trillion bytes of data per day," said Theodore Kapela, a programmer at Polytechnic involved in the project. "It is virtually impossible to store that much data in a single place and have it in a form that is accessible to researchers. Therefore, a distributed system is imperative."

Much of the information collected, and continually being updated, is derived from the National Aeronautics and Space Administration's orbiting satellites, which for the past two decades have been sending back streams of data on the biosphere.

"The basic data consists of sets of sensor information sent back from satellites," said David Hockney, director of Polytechnic's Center for Applied Large-Scale Computing (CALC). "One data set might represent a vegetation index of Africa in a certain month of 1982, for example.

"Each set is represented by a record cre-

See **Index**, *page 42*

BRIEFS

Da Vinci Systems Corp. has announced two new technical support programs, AdvanceTech and ProTech. They offer users two- and four-hour response times, respectively. There will be a fee for each of these programs, but Da Vinci will also continue to offer free technical support without guaranteed response times. AdvanceTech costs $2,500 a year, while ProTech costs $179 per year for one or two servers and $295 per year for three or more servers.

Da Vinci: (919) 881-4320.

Ross Systems, Inc., based in Redwood City, Calif., has announced a new set of client/server applications for human resources and payroll departments. The Human Resource CS Series includes human resource applications such as applicant tracking, and payroll applications such as retroactive pay. It runs on Motif, Apple Computer, Inc. Macintosh and Microsoft Corp. Windows clients and numerous servers. Pricing starts at $35,000.

Ross: (415) 593-2500.

Sterling Software, Inc., a Dublin, Ohio, electronic data interchange software vendor, has announced Commerce:Complete, a turnkey EDI package. Commerce:Complete is designed to provide users with everything they need to become immediately EDI-capable. The package consists of a Digital Equipment Corp. personal computer with a printer and modem, Sterling's Gentran:Basic and Commerce:Connection software, and three years usage of Sterling's Commerce:Network at $100 per month plus hardware and software maintenance costs. Commerce:Complete is available in a three-year lease package for about $380 a month.

Sterling: (614) 793-7000.

Powercore, Inc., a Manteno, Ill., group scheduling software vendor, has named John Hitchins company president, replacing Powercore founder Rich Juricic, who is now chief executive officer and chairman of the board.

Worldtalk Corp., a Los Gatos, Calif., vendor of electronic messaging software, has named David Atlas as director of market development. He will be responsibile for business development, third-party marketing and channel marketing. Previously, he was channel development manager at Beyond, Inc., a Cambridge, Mass., electronic mail vendor.

See **Briefs**, *page 40*

IDC study weighs database vendor support

BY WAYNE ECKERSON

Framingham, Mass.

It's no secret that users expect vendors to provide a high level of service and support. Performance in this area often sways customers from one vendor to another.

A soon-to-be published study from International Data Corp. (IDC) here will help users evaluate the software support services offered by six leading U.S.-based database vendors: Borland International, Inc., Computer Associates, Inc., Informix Software, Inc., Ingres, Oracle Corp. and Sybase, Inc.

The study, written by analyst Kurt Johnson, explains that database vendors have been forced to expand their support offerings in recent years to service customers with increasingly diversified operating environments and technical requirements. Whereas vendors previously got by with just telephone support, they now offer advice and information through electronic bulletin boards, fax-back services, CDROM-based offerings and various levels of on-site support.

"The goal among vendors is to provide enough choices that customers can choose the level of support that best fits their individual needs," Johnson writes.

The study gives high marks to Computer Associates, Informix Software and Ingres for offering the widest range of services and allowing users to tailor those services to meet requirements. Users have complained in the past that database vendors forced them to buy a higher level of service than they needed in order to obtain a single type of option.

Oracle and Sybase, on the other hand, came out on

See **Study**, *page 41*

NET APPLICATIONS

by Richard Raysman and Jeffrey Neuburger

Avoiding costly mistakes when selling net apps

Network users looking to market internally developed network applications take heed: Proceed with caution.

As a user-turned-vendor, you can end up facing unexpected logistical, technical and legal problems, say nothing of costly obligations and potential liabilities. Companies need to learn to carefully negotiate with prospective purchasers or licensees to minimize exposure and avoid expensive lessons in software development, distribution and maintenance.

RAYSMAN

As a preliminary matter, you must choose a method of distribution. One option would be to establish and finance a separate subsidiary or related entity to distribute the product. Although this may maximize the returns on the product, it may require a significant investment. The other option would be to license the application through existing distributors. This would require a lower investment and less risk but would probably not be as profitable.

Prospective licensees or purchasers regularly seek response time warranties from net application vendors. Will you feel comfortable warranting the application's response time? Will it run the same in the customer's net? Try narrowing response time warranties as much as possible and limit them to specified hardware and software configurations.

JEFF SLOTNICK

NEUBURGER

Most customers will want support. What continuing support obligations are you willing to assume? One solution may be to subcontract support to a software maintenance house.

Software customers also typically want vendors to bear the risk if a network application fails to perform as promised. Users may ask for indemnities concerning the risk of certain third-party potential liabilities, including intellectual property infringement. Risk sharing represents potential liabilities that may arise in the future. If the customer is insistent on including such provisions, bargain for a reasonable limitation on the liability to minimize your exposure.

By carefully crafting the license or purchase agreement, you can reduce the exposure presented by the marketing of an internally developed product. Expect the effort to present some risk and cause some distraction from primary business activities.

➔ Raysman is a partner and Neuburger is an associate at Raysman Brown & Millstein, a New York-based law firm. They can be reached at (212) 944-1515.

WordPerfect intros gateway to IBM OfficeVision/VM

BY BOB BROWN

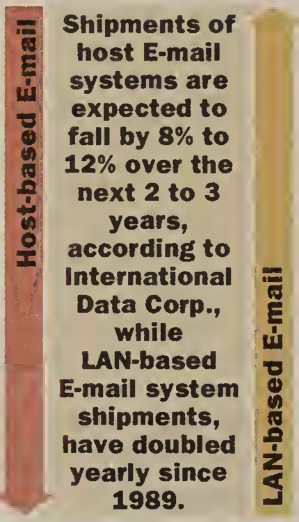
Orem, Utah

WordPerfect Corp. last week announced a new version of its WordPerfect Office-to-IBM OfficeVision/VM gateway with expanded capabilities for integrated messaging and group scheduling.

WordPerfect Office OfficeVision/VM Gateway 4.0 for OS/2 is designed to serve as a link between IBM's host-based messaging and scheduling system and the local-area network-based WordPerfect messaging system.

WordPerfect's gateway already allowed for some group scheduling integration between OfficeVision/VM and WordPerfect Office, but the new edition offers several enhancements, according to Eldon Greenwood, product marketing director for WordPerfect.

For example, the gateway will let users of either system interrogate the schedules of users on the other system to find open times for possible meetings. Previously, only WordPerfect Office users could search OfficeVision/VM schedules. The new version also includes a utility for moving end users' mailboxes and calendars off of OfficeVision/VM and on to WordPerfect Office.



Shipments of host E-mail systems are expected to fall by 8% to 12% over the next 2 to 3 years, according to International Data Corp., while LAN-based E-mail system shipments, have doubled yearly since 1989.

"This utility allows for a gradual migration," which is what is needed when moving from a host- to LAN-based electronic mail system, Greenwood said. WordPerfect has designed WordPerfect Office as an integrated E-mail and group scheduling system, much like OfficeVision/VM and other host-based systems, he added.

David Ferris, editor of the "Ferris E-Mail Analyzer" newsletter in San Francisco, said the group scheduling integration enhancements are significant. "Roughly one-third of all [OfficeVision/VM] users are heavy users of calendars, and they have had no clear migration path to LAN-based E-mail," he said. "The evolution of gateways to handle not just messaging, but calendaring information as well, is key to moving away from host systems by any means other than doing so all at once."

WordPerfect's new gateway also includes support for directory synchronization between WordPerfect Office and OfficeVision/VM, previously a manual process for the E-mail administrator. Now when a change is made to the WordPerfect Office directory, a message is automatically generated that alerts the gateway of this change. The gateway then converts the message into an address book entry on the OfficeVision/VM system.

In order for changes to the OfficeVision/VM directory to be reflected in WordPerfect Office, the E-mail administrator must send a copy of the directory periodically to the gateway, which identifies any changes.

Another new feature of the gateway is that it runs entirely on the server, unlike previous versions, which had a mainframe component.

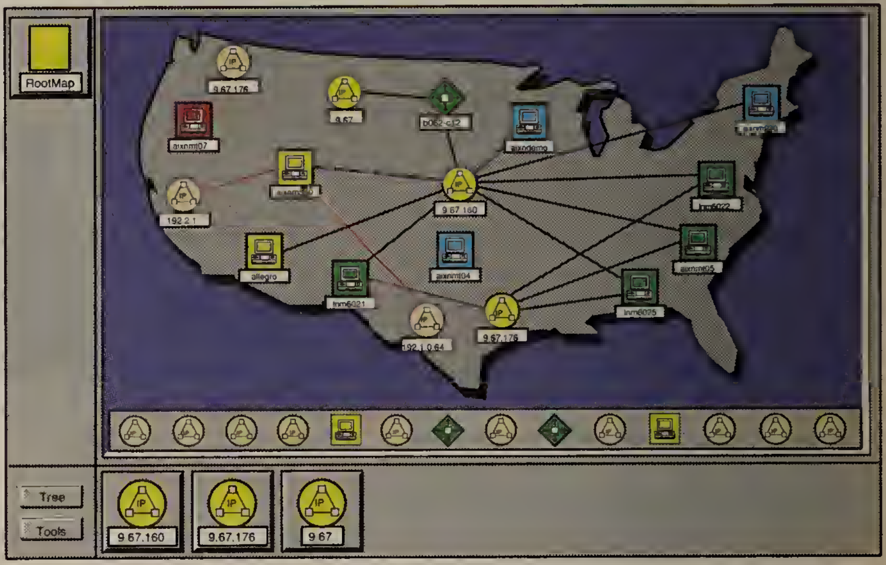
The WordPerfect Office OfficeVision/VM Gateway 4.0 for OS/2 requires OS/2 2.0 or higher and the OS/2 Communications Manager/2 Version 1. The gateway is available now for $9,995.

✆WordPerfect: (800) 451-5151.

BRIEFS

Continued from page 39

The Wollongong Group, Inc., a Palo Alto, Calif., vendor of communications software, will support a host of emerging electronic messaging application program interfaces (API) in its PathWay Messaging products. Wollongong has committed to supporting Microsoft Corp.'s Messaging Application Programming Interface (MAPI), the X.400 API Association's Common Messaging Calls, the Open Systems Interconnection Object Manipulation API, X.500 Directory Services and the X.400 Messaging API. The first interface will be Microsoft's MAPI, to be available in the fourth quarter on Wollongong's PathWay Messenger client E-mail software.



Control,

Hapless hubs. Rogue routers. Stressed out servers. Nervous nodes. Paralyzed printers. Disappearing data. Power-crazed PC users. Budget slashing bean counters. It's enough to make a network manager's job unmanageable. But now there's a better way to regain control. To master the madness. And your own destiny.

AIX SystemView NetView/6000 V2

NetView®/6000 Version 2 from IBM Networking Systems offers a greater range of management functionality, has an end user interface that keeps things simple, and incorporates OSF™/DME standards. It's a UNIX®-based management platform that runs on RISC System/6000® workstations with IBM's

SQL group wraps OSI spec

BY PETER LISKER

Proving once again that standards are often established before the market is ready to deal with them, the SQL Access Group (SAG) has announced that its Remote Database Access (RDA) specification for OSI has been finalized.

Now available as an X/Open Company, Ltd.'s X/Open Portability Guide (XPG) document, the RDA for Open Systems Interconnection specification is designed to enable database tool vendors and developers to build heterogeneous, interoperable, networked relational database systems.

"We think this will provide a coherent environment for vendors seeking to provide interoperability in the important database arena," said Merrill Holt, vice chairman of SAG. "The implementation of standards for database access is a critical component of our effort."

The RDA specification defines communication between SAG-compliant clients and remote database servers. It is used by database vendors and developers to specify how requests for data from clients should be sent across the network in a uniform manner so that heterogeneous products can interoperate.

In addition, SAG announced the release of its first Snapshot version of an RDA specification for Transmission Control Protocol/Internet Protocol networks.

The group, in conjunction with X/Open, uses a three-stage process for specification review and acceptance, with the first stage being release of a snapshot describing the proposed specification, followed by a preliminary specification and then as an XPG specification for general acceptance.

On the TCP/IP front, SAG release of the snapshot specification is a move that will provide an open systems standard for the critical TCP/IP environment. Holt acknowledges that the specification is likely to be ahead of the marketplace but is valuable nonetheless.

"We feel that TCP/IP is the predominant communications protocol in the networking arena today and that it is imperative that SQL Access Group address interoperability and standards in the TCP/IP area," he said. "We expect that it will still be some time before we really see a lot of application development ."

©SAG: (603) 434-0802.

Study

Continued from page39

the low end of the evaluation. Oracle took heat because it has not significantly altered its service offerings to meet changing user needs, relying almost exclusively on telephone support. Sybase came up short because it only recently modernized its support program.

Borland is the only firm that offers free telephone support, but that is likely to change because of financial pressures cutting into the firm's bottom line, the study said.

Grading database support

Company	Strengths	Weaknesses
Borland International, Inc.	Free telephone support	Premium support package
Computer Associates International, Inc.	Strongest on-line services	None
Informix Software, Inc.	Customizable support packages	None
Ingres	Widest array of support options	None
Oracle Corp.	Solid expertise	Relies too heavily on telephone support
Sybase, Inc.	Training bundled with support	Only recently expanded support offerings

SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.
GRAPHIC BY SUSAN J. CHAMPENY

Mickey Lutz, director of technology management at PHH Fleet America in Hunt Valley, Md., said database vendors are struggling to provide quality service because it is hard to expand support staffs fast enough to keep up with rapid growth.

In addition, most database products are still so new that the firms have a difficult time finding people with sufficient expertise to answer customer questions.

Lutz said the wisest move a user can make is to hire an independent consultant or specialist from the database vendor to help install the database and train the firm's technical staff. While this is costly, it helps prevent future problems.

Johnson said database vendors will continue to expand electronic support services over the next couple of years to minimize the cost of telephone or on-site support. But he added that vendors should use electronic services to enhance their support offerings, not replace them.

"Some users will always be uncomfortable using electronic service and will prefer to speak to a human being," he said.

©IDC: (508) 872-8200.

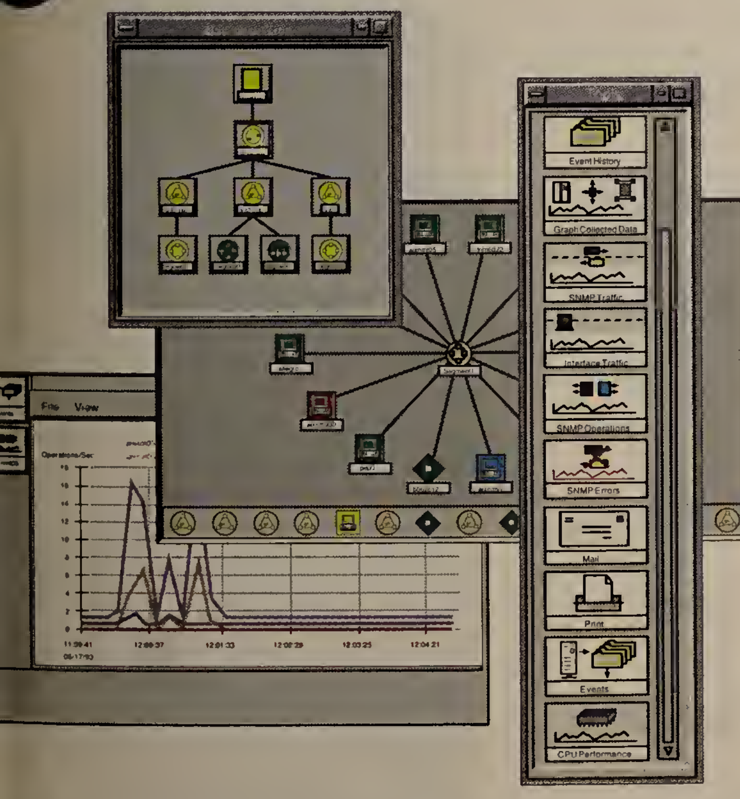
open AIX/6000™ operating system. And it installs with just 6 clicks of a mouse. Now that's control.

It's also just the beginning. NetView/6000 offers open topology and dynamic discovery for the automatic mapping of both IP and non-IP devices. It can natively manage SNMP, CMIP and other protocols. And it provides an easy way to set thresholds, establish filters and automate responses to events. It even collects performance data so you can analyze overall network productivity and implement preventive maintenance. That's control with power.

And speaking of power, IBM supports NetView/6000 with powerful applications like System Monitor/6000 for distributed management and Trouble Ticket/6000 for extensive problem management. For small businesses or remote branches with 32 nodes or less, NetView/6000 Entry is an effective, low-cost solution. And NetView Service Point offers two-way communications with NetView on the host. That's control with power and flexibility.

For enhanced support and customization, IBM has established the NetView/6000 Association. This impressive list of leading hardware and software developers continually adds to the growing number of robust solutions that are rapidly helping NetView/6000 emerge as the management platform of the future. That's control with power, flexibility and support.

yourself.



These days, it's manage or be managed. Control or be controlled. NetView/6000 provides an unsurpassed combination of superior functionality and open architecture. It's a solution so sophisticated and flexible that it can manage not only your heterogeneous network, but itself as well. And that means you can take control of your own destiny.

Obviously, we can hardly control our enthusiasm. To order or for more information about NetView/6000, call 1 800 IBM-CALL, ext. 117.

NetView/6000. It may well be the perfect way to resolve all of your control issues.

IBM, AIX, NetView and RISC System/6000 are registered trademarks and SystemView and AIX/6000 are trademarks of International Business Machines Corporation. UNIX is a registered trademark of UNIX System Laboratories, Inc. OSF is a trademark of The Open Software Foundation, Inc. ©1993 IBM Corp.

IBM®

Isocor, Worldtalk to integrate message systems

BY BOB BROWN

Isocor and Worldtalk Corp. last week announced a joint development agreement under which they will build an Intel Corp.-based X.400 messaging switch designed to link multiple electronic mail systems.

Under the agreement, the vendors will build Worldtalk 400 for Isocor Server, a version of the Worldtalk 400 E-mail software to reside on Isocor's Isoplex 1988 X.400 E-mail transport engine. The engine will run on an Intel 80386-based or higher computer equipped with The Santa Cruz Operation, Inc.'s SCO Unix operating system. Previously, Worldtalk 400 ran on Hewlett-Packard Co.'s 9000 Series 800 Reduced Instruction Set Computing system.

Worldtalk's technology handles connectivity, address management and message attachment conversion between disparate E-mail systems. The software allows integration between E-mail systems such as Lotus Development Corp.'s Notes and cc:Mail, Microsoft Corp.'s Microsoft Mail and Message Handling Service-based E-mail systems.

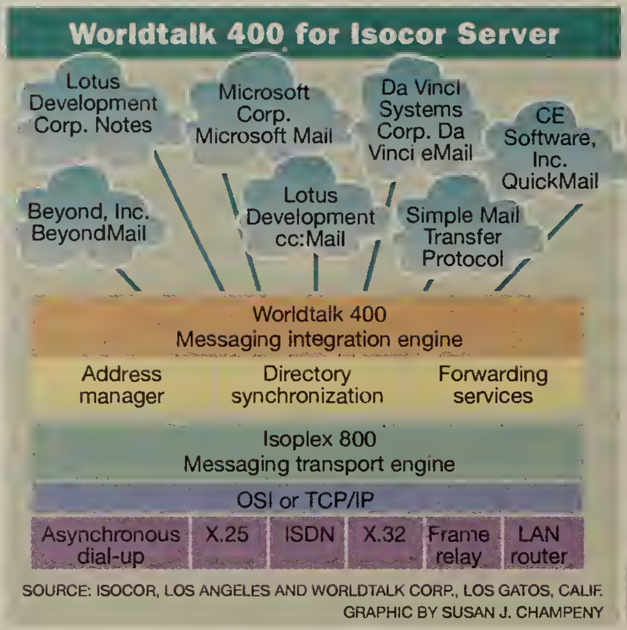
Isocor's Isoplex 800 technology provides E-mail transport via Open Systems Interconnection or Transmission Control Protocol/Internet Protocol nets.

"What this agreement does is open up a series of whole new markets for us," said Mark Stieglitz, vice president of marketing at Worldtalk. "We've had a very high-end system that appealed to very large companies. The Intel-based product lets us into the departmental level — a level down from the backbone — for people that have fewer mail systems or don't want to take the plunge into an HP-class backbone."

Stieglitz said the new Intel-based switch will give users the choice of building distributed backbones consisting of Intel-based message switches or backbones based on a few HP-based switches with the Intel systems serving as feeder nodes.

Worldtalk 400 for Isocor Server is in beta testing and will be available in September. Pricing has not been announced yet. Isocor, based in Los Angeles, and Worldtalk, based in Los Gatos, Calif., will jointly market their products.

©Isocor: (310) 476-2671; Worldtalk: (408) 399-4028.


Worldtalk 400 for Isocor Server
Lotus Development Corp. Notes
Microsoft Corp. Microsoft Mail
Da Vinci Systems Corp. Da Vinci eMail
CE Software, Inc. QuickMail
Beyond, Inc. BeyondMail
Lotus Development cc:Mail
Simple Mail Transfer Protocol
Worldtalk 400
Messaging integration engine
Address manager
Directory synchronization
Forwarding services
Isoplex 800
Messaging transport engine
OSI or TCP/IP
Asynchronous dial-up
X.25
ISDN
X.32
Frame relay
LAN router
SOURCE: ISOCOR, LOS ANGELES AND WORLDTALK CORP., LOS GATOS, CALIF.
GRAPHIC BY SUSAN J. CHAMPENEY

Index

Continued from page 39

ated in a directory interchange format, or DIF, by whomever holds the actual data. This is the 'metadata' that our database holds," Hockney added.

Projects are also in place and will be augmented to produce even more information, notably the Earth Observing System that will relay data from at least two more major satellites by the late 1990s.

As the primary custodian of global change data, NASA was mandated by Congress to make this data accessible. A NASA grant to the Consortium for International Earth Science Information Network (CIESIN) — of which Polytechnic University is a member — was awarded to begin the process of developing a new system.

The project was inaugurated by a group led by Tony Monteiro, assistant director of Polytechnic's CALC, who found the existing database environment at NASA to contain an abundance of data, most of which was unusable and difficult to access.

NASA maintained the Global Change Master Directory, which had to be downloaded from NASA to CIESIN's own computers to be used. Due to the lack of a GUI, this centralized approach presented significant limitations in terms of providing access to users who wanted to work with the data, a situation Monteiro and his group hoped to rectify.

The solution to the interface problem turned out to be the XFacemaker user interface management system from Non Standard Logics, Inc., a Boston-based company. CALC progammer Hiromitsu Shiotsuki was given the task of prototyping the interface.

"It took about three days to learn how to use XFacemaker well," Shiotsuki said. "Then we spent about three days drawing the windows and about two weeks integrating the interface with the C code that runs the application."

The interface system now consists of approximately 10 main windows, along with selection boxes, error boxes and status windows.

Using the XFacemaker DQS interface, a user can view the distributed database as a single information resource. The DQS interface allows researchers to learn within seconds exactly what information is available and where it is located.

Beginning users are walked through the system via pop-up menus and keyword selections, while more experienced users can employ their own expert search techniques including full boolean instruction capabilities.

Anticipating continuing evolution in communications technology, Polytechnic's Kapela developed communi-

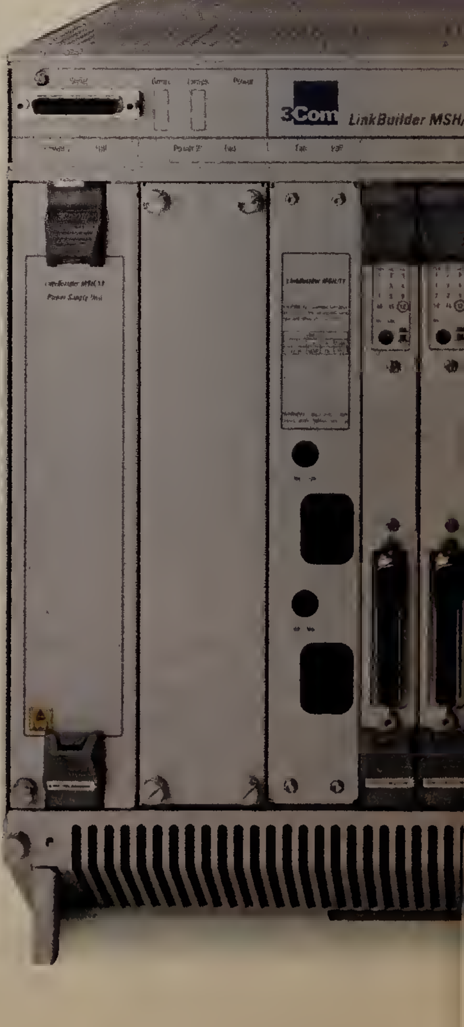
The next time yo
more advanced hub

For a truly intelligent way to network, why not choose a hub advanced enough to be its own replacement? A hub designed to easily accommodate any change your growing network requires. A hub flexible enough to allow you to customize and configure your network as it grows.

It's 3Com's LinkBuilder® Multi Services Hub. The most advanced, cost-effective networking solution in the industry.

Thanks to its unique "technology-independent" backplane, rather than adding backplanes for every new technology, the LinkBuilder MSH™

©1993 3Com Corp. (408) 764-5000. 3Com, Networks That Go the Distance, MSH, and LinkBuilder are trademarks of 3Com Corp.



See us at INTEROP '93 Booth 412

cations protocols that support the DQS interface using the four upper levels of the International Standards Organization Development Environment (ISODE) implementation of the Open Systems Interconnection stack.

"ISODE provides many services at the application layer that are not directly provided by TCP/IP. We felt it would take too long to develop our protocols from TCP/IP," Kapela said. "Even though our present system is built on TCP/IP, we feel that we will migrate to OSI as it becomes more of an accepted standard.

"ISODE gives you tools that let you use the four upper layers of the stack but still allow you to run on TCP/IP," he said. "Even though the OSI protocols have not kicked in yet, government agencies will be forced to migrate to the OSI standard. And when they do, we will be in a position to remove the lower level TCP/IP layers and replace them with the appropriate OSI protocols."

The CIESIN team is now studying ways to make the system more flexible and encompassing. Future refinements will let a broader base of users access and manipulate data within the ditributed database net.

Kapela sums up the different approaches saying, "The amount of information being generated within many disciplines is burgeoning. But if it cannot be found and used, its value is marginal." Z

Oracle to convert Informix users with gateway

BY DAVID KELLAR

Tokyo

Oracle Corp. Japan next month will start shipping software designed to allow users of Informix Software, Inc. relational database management systems to run their applications unmodified under Oracle 7.

Developed in Japan, where Informix's early entry helped it gain a dominant share of the Unix database market, the $27,000 Informix Application Gateway is a database interface conversion tool intended as a stopgap measure for users wanting to switch to Oracle without first taking the time to rewrite existing applications, said Akira Kitamura, manager of Oracle Japan's OEM Marketing and Marketing Promotion divisions.

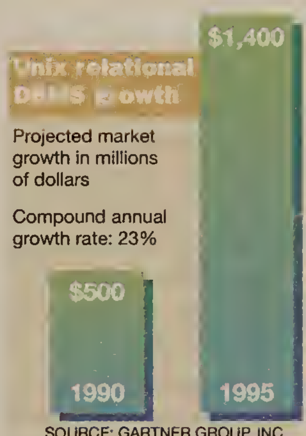
According to Oracle, switching from one relational DBMS platform to another usually requires half a year and 12 man-months. With the new software, it says the switch can be virtually immediate.

Oracle also plans to release the software in the U.S., Europe and other countries in Asia by the end of the year.

"Areas where Informix is relatively strong — Europe and Asian countries such as Korea, Taiwan and Singapore — will be our next targets with this product," Kitamura said. "We've already received many requests from users in these countries."

The gateway software can be used with applications written in Informix 4GL or Informix ESQL/C and operates by overriding the Informix SQL commands generated at runtime and converting them to Oracle SQL commands.

"The C language code generated by the Informix 4GL compiler can run unmodified on the Oracle platform," Kitamura explained. "However, SQL commands — though in large part standard — do differ slightly between platforms, requiring us to override them at the time of execution."



SOURCE: GARTNER GROUP, INC., STAMFORD, CONN.

International Data Corp. figures place Oracle at the top of the Unix relational DBMS heap in North America with a 40% share, followed by Sybase and Informix with 20% and 15%, respectively.

In Japan, the situation is reversed, with Dataquest Japan, Ltd. a year ago giving Informix the top spot with a share of 30%, followed by Unify and Oracle at 25% each.

Though no official figures are available for the past year, Oracle claims it has pulled even with Informix at the 30% level.

Oracle's relative weakness in the Japanese market is due largely to a late start, said Dataquest Japan analyst Satoshi Uchiyama.

"Oracle Japan, which started operations in 1991, only started selling effectively in 1992. Ascii Corp., the licensed distributor for Informix in Japan, had more than 150 value-added resellers (VAR) marketing Informix-based systems at that time, while Oracle had only a few," Uchiyama explained. "But Oracle is now growing rapidly."

Indeed, Oracle has doubled its number of employees — and sales revenue — every year for the past two years, and plans to continue the pace through 1995, growing its current 200-plus staff to more than 800 employees, according toKitamura.

Oracle Japan's sales grew from $34.5 million in fiscal 1991, ended May 1992, to $56.4 million in fiscal 1992.

Though minuscule compared with Oracle's worldwide sales of $1.5 billion, Kitamura said the Japanese market is poised for explosive growth and is currently the centerpiece of Oracle's worldwide expansion efforts.

To meet its goal of capturing 50% of the Japanese market within three years, Oracle is putting great effort into developing its distribution channels.

The company currently claims to have 60 dealers and 20 to 25 VARs, "with the number growing nearly every day."

Strong dealer and VAR channels are necessary to succeed in Japan, Kitamura said. "In Japan, approximately 70% of our sales are indirect [through dealers, VARs and OEMs], while in the rest of the world this figure is less than 1%."

➾ Kellar is a Tokyo correspondent for IDG News Service.

ur network needs a
you'll already have it.

allows you to mix Ethernet and Token Ring networks today, and add ATM and other new networking technologies when you need them. All the while avoiding costly and disruptive hardware upgrades.

But why not see for yourself. Just give us a call at **1-800-NET-3Com** for a free copy of 3Com's white paper "High-Performance Scalable Networking," and more information about the LinkBuilder MSH. You'll learn the easiest way to plan for the future is to have a hub that's already there.

3Com®

Networks That Go the Distance™

Circle Reader Service #3

Editorial

My copy of Paul Samuelson's *Economics* textbook defines oligopoly as "a horrible sounding word" that describes a market where the product is homogenous, the sellers are large and competition is marked by heavy reliance on advertising, quality rivalry and administered pricing. "Oligopolists are practically sure to recognize 'our mutual interdependence' — namely that we must end up charging about the same prices," the venerable economist writes.

Sound like the long-distance market of late? I can hear the rumblings already: "What is he talking about? There are hundreds of long-distance suppliers, and look at all the benefits we've won from deregulation!"

Competition has been a boon, but consider some market realities. While there are many long-haul providers, AT&T, MCI and Sprint control the market. Size and market share are key to market control. Competition has driven price reductions. But much of that price cutting stemmed from local access reductions that may be a thing of the past. Worse, the Big Three are moving in lockstep on pricing and the trend is ominous. Case in point: After posting strong financial results, first AT&T, then MCI and Sprint announced rate hikes of roughly the same size. The timing wasn't coincidental.

Have we entered an oligopolistic era in long-haul? That's not clear. But it is clear that it's time to rethink basic policies in the telecommunications arena. One is the ban on local carriers offering long-distance. Unleashing the RBHCs could spur new price competition and push all carriers to greater service innovation — something sorely needed in the local loop.

You may be aghast at the suggestion. I'm not entirely comfortable with it myself, but consider this: The FCC could reassert its leadership by combining the carrot of local carrier entry into long-distance with the stick of stringent requirements for opening up the local loop.

The FCC has moved haltingly to boost competition in local services, including some small steps taken last week. But it could kick up the pace, forcing carriers to live up to the spirit of its Open Network Architecture plan by demanding more open access to RBHC nets and more realistic pricing for ONA services. As one well-known player in the industry said recently, the RBHCs' case for entry into long-haul is stronger than it's been in a long time. Do you agree?

Let me know what you think.

➺ JOHN GALLANT

Teletoons

FRANK AND TROISE

Alice ... we're very happy with your work here on the net, so we're increasing your mousepower... Congratulations!!
Phil Frank

REALITY CHECK

By Thomas Nolle

Internetworking doesn't have to be complex

Transmission Control Protocol/Internet Protocol is great. Internetworking is great. There, I've said the politically correct things.

What isn't great — or politically correct — is that users are being led to believe that every little LAN-to-LAN connection they make means building a full-blown rival to the national Internet, which links universities, think tanks and a million government agencies. Vendors and consultants are making the process of connecting local-area networks more complex than it has to be, and users are losing out as a result.

A few months ago, I visited a large user that was trying to cope with a major expansion in sites that resulted from its acquisition of another company. The user had some applications using IBM Systems Network Architecture, a lot using Novell, Inc. NetWare and a few using TCP/IP. The user also had the general idea that routers would be a part of the network solution to the expansion, so a premier router vendor was called in to talk about it. So far, so good.

Now for the problem. The router vendor went into what can only be called TCP/IP technology tornado mode. The user was unnecessarily educated on all of the agonizing details of TCP/IP: boundary gateway protocols, internet addressing, convergence of routing tables in the event of a network failure, Management Information Bases and datagrams.

After the presentation, the user probably could have designed the new National Information Infrastructure. But the user couldn't apply a word of it to the company's net. The user's route structures, despite the acquisition of new sites, were simple and hierarchical, so virtually every point the router vendor made was irrelevant to the user. I was curious why a router vendor would raise so many difficult issues, so I asked at both the user and vendor organizations. It turned out the salesman made two critical errors.

First, he didn't bother to ask the user to draw the company's business structure on the board. Hey, one network is pretty much like another, right? Second, he had a canned pitch of protocol discussions to cover, and he covered them whether or not they were relevant to the user's situation.

The average internetwork prospect isn't looking to build a multicompany research network. While some large businesses may actually need all of the arcane router protocols available in TCP/IP, many users don't need anything more than a simple static routing table or a simple route management protocol such as Router Information Protocol (RIP). And many companies don't need TCP/IP at all, as heretical as that may sound in this day and age.

Instead of talking about simple options, whether TCP/IP-based or not, salespeople and even articles in the trade press are bombarding users with things like "policy routing." Is that insurance? It sounds like mumbo jumbo to many users, and for a number of them, it is just that.

Users looking to build internetworks should follow three simple rules:

Rule 1 is to build the internet on the protocol running on most of your LANs. If you don't, you may have problems maintaining net services to applications you already depend on.

Killing your information infrastructure in the present by making the network incompatible with the application is one way to plan for the future, but it is not a career-enhancing one. This means that if you are happily running NetWare, don't rush out and get TCP/IP just because you think it's state of the art.

Rule 2 is to match route management features with route complexity. Networks with few sites and few alternate routes, or those that connect all routers to one another using a new protocol like frame relay, don't benefit from sophisticated route management protocols like Open Shortest Path First.

For these types of networks, pick the simplest route management strategy you can buy — TCP/IP's RIP, for example. Most frame relay-based internetworks connect every router to every other router, but it's astonishing how many users are buying complex route management for frame relay.

The final rule is to throw out any salesperson who doesn't start by asking about your application. When a network user calls me for help with a product selection, the first words they utter are almost always, "Let me tell you about my problem." This implies that nobody the user has talked to up to that point has solved it. Usually it's because nobody has tried to — they've only tried to sell the user something.

It may be unrealistic to assume sales organizations will altruistically confess that their latest feature doesn't matter a hoot to anyone but the National Science Foundation. And many just have not been trained to provide much insight.

That's where the press comes in. That neat article on "photonic routing" should ask, Who cares? And that question should be answered objectively, not the way the vendor might want it answered. By helping prioritize the issues, the press can bring users and vendors together in an honest relationship, which is the only kind that will ultimately work.

By the way, there's a happy ending to the SNA user's story. The company bought routers from another vendor, one that took a simple and realistic approach to the user's requirements.

➺ Nolle is president of CIMI Corp., a technology assessment firm located in Voorhees, N.J. He can be reached at (609) 753-0004 or via MCI Mail at 349-5845.

Send us letters

Have you seen an article in *Network World* with which you strongly disagree or heartily concur? If so, send us your thoughts in a letter to the editor via mail to Editor, *Network World*, 161 Worcester Road, Framingham, Mass., 01701; via fax to (508) 820-3467; or via the Internet to network@world.std.com. Or if you prefer, you can leave a voice mail letter by calling our Letters to the Editor Hotline at (800) 622-1108, Ext. 461.

Please include your name, title, company, city and a phone number for verification.

REGULATORY ISSUES

By Peter Thornton

Break up the Baby Bells

If the Clinton administration is serious about making the U.S. a 21st-century telecommunications showcase, it will hurry the Communications Competitiveness and Infrastructure Modernization Act of 1993 through Congress and into law.

Deregulating the regional Bell holding companies and injecting much-needed competition into the local loop will allow alternative carriers to provide services that users can't get from the RBHCs.

By creating more competition, the act will allow users to get more flexible service options, such as fractional T-1 lines or Integrated Services Digital Network circuits for telecommuting, from alternative carriers rather than having to wait for the RBHCs to provide them. The RBHCs currently offer nothing between 56K bit/sec and T-1 (1.544M bit/sec).

Competition will also speed upgrades to the RBHC network infrastructure. In fact, if there was competition, I bet the RBHCs would write off all the copper in the local loops and start installing fiber-optic digital circuits immediately. Otherwise, they would lose out on the coming digital multimedia revolution.

We modern workers need one or two high-speed circuits of at least 1M bit/sec direct to our desktops and service providers to feed whatever we choose onto our personal digital circuits from the menu of 10,000 available networks, events, news, information and other services.

As a marketing manager in the network/systems integration business, I often have to talk to the RBHCs and long-distance companies to design networks for clients. Since divestiture, helping my clients with higher speed networks has become more difficult because the RBHCs don't seem to be able to provide the products and services — or even the information — their customers need.

But why should they? Several RBHCs were on *Business Week's* Top 20 Most Profitable Companies list, which suggests that monopolizing the plain old telephone service business is all they have to do to get rich. However, this does not give them any incentive to offer new digital technology or new services.

For example, I've been trying to get an RBHC to give me some information about ISDN — basic stuff like: How much will it cost? When will it be available? To what and whom can I connect? You'd think after 10 years this RBHC would have a marketing person who knew something. Oh, no. "We're the telephone company and we don't care," as Lily Tomlin used to say.

I called my local telephone business office to ask for pricing and availability. I was told someone would call me right back. A week went by, and I heard nothing. I called again and was told, "Someone will definitely call you back within 24 hours." Still no call. I called the person that was supposed to call me back and left a voice mail message. The person called back once when I was out and hasn't called since.

I finally got the name of a helpful person at my RBHC from a vendor of ISDN terminal adapter cards. He told me the story: I couldn't get ISDN without Centrex, and a Primary Rate Interface (PRI) was twice as expensive as a Basic Rate Interface (BRI) on a per-channel basis.

Another RBHC offered me a couple of hundred BRI lines for about half the price of the equivalent ISDN PRI. Instead of 20 tidy T-1 jacks and 20 simple PRI communications servers — such as bridge/routers — they wanted to install 230 BRI jacks on the wall, shelves full of Network Termination 1 interfaces and terminal adapters, and hundreds of cables to the ports of the dozens of BRI bridge/routers.

If only there was some competition in the local loop; if only I could call a fast-moving, hard-driving, service-oriented, alternate carrier that would rush to install a digital service and take my money.

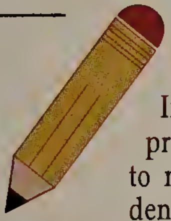
There are plenty of opportunities for competition that would make lots of money for the RBHCs and alternative carriers, while making user businesses more productive.

Users want a piece of the available technology — a digital circuit to our offices using proven technology at a reasonable price. That was the ISDN promise.

Now that long-distance backbones are digital, can't we please have some action on the last mile? Passing the Communications Competitiveness and Infrastructure Modernization Act of 1993 would be a big step in the right direction and help make modern telecommunications more than just a dream.

➻ Thornton is marketing operations manager for Tran Network Systems, a network software and systems integration firm based in Summit, N.J. He can be reached at (908) 464-7577.

Letters



NW goes electronic

My organization subscribes to *Network World* and finds it very useful. We have a single subscription that we route internally to a subset of our 120 users.

However, I often find that selected articles, such as your recent Buyer's Guide on Internet service providers (July 19, page 31), need to be sent to a more general audience. Is there any way to download this type of article as a standard text file so that it can be distributed through our electronic mail system?

We might also be interested in using this article as a handout to some of our clientele. We are an educational institution, and the department that handles correspondence courses has set up several courses that are available through the Internet. The Internet service providers article would be helpful to many of the long-distance students who wish to take these courses. What are the procedures for getting reprint permission for your articles?

We find your magazine very informative and would like to use it to better effect.

Clemeth Ray Saylor
Net administrator emeritus
University of Washington, Extension
Seattle

Editor's note: We offer our data via Mead Data Central, Inc.'s Nexis information retrieval service and Dialog Information Services' Dialog retrieval system. We also offer a service called NetText, which is an on-line library of articles printed in Network World *and our sister publication* Computerworld, *during the past three years. For NetText subscription information, call (800) 643-4668.*

In addition to these services, we are considering linking our bulletin board system (BBS) to our in-house Topic retrieval system, which will allow users to retrieve NW *articles via our BBS. We are also considering linking to the Internet and allowing users access to our data via Internet for a monthly subscription, hopefully in 1994.*

Jurassic praise

I wanted to share my delight over Michel Kabay's recent Security Perspectives column (July 26, page 89).

I have read dozens of articles in a wide variety of publications, but this is the first time I've seen basic network security issues presented in such a delightful, accurate and thought-provoking manner. The use of the movie *Jurassic Park* to portray how not to run a network was sheer genius. The article has been widely shared in-house and now adorns numerous cubicles. Keep up the good work.

Brian Williams
Telecommunications/LAN manager
Ameritech Data Center
Chicago

It can be done

I must take exception to the gist of the article by Eric Smalley titled "Fast forward to LAN-based video" (July 26, page S39). He wisely states, "Like any other application category, video must accommodate existing computing infrastructures as much as possible in order to gain widespread use." But he then abandons that premise.

He goes on to state, "The problem, however, is that existing LAN technology is not designed to carry synchronous traffic such as video."

True, it was not designed to do so, but existing local-area networks can carry real-time compressed video designed to accommodate existing LAN infrastructures. As a member of the ANSI-accredited X3L3 Standards Committee and ISO Working Group on the Moving Picture Experts Group (MPEG) standard under development, I understand the technical problems encountered by the first generation of video compression solutions when delivered

See **Letters**, *page 54*

NETWORK WORLD

Editor
John Gallant

Executive Editor
John Dix

NEWS
Assistant Managing Editor
Paul Desmond

ENTERPRISE INTERNETS
Jim Duffy - Senior Editor
Maureen Molloy - Senior Editor

Michael Cooney - Senior Editor
14701 Bentley Sq., Centreville, Va 22020
Phone: (703) 830-8138 Fax: (703) 830-7963

LOCAL NETWORKS
Skip MacAskill - Senior Writer
Christine Burns - Staff Writer

Caryn Gillooly - Senior Editor
5423 Gladewright Dr., Centreville, Va 22020
Phone: (703) 266-1537 Fax: (703) 266-1543

Fredric Paul - Senior Editor
2088 Union St., Suite 2
San Francisco, Calif. 94123
Phone: (415) 771-4103 Fax: (415) 771-2817

GLOBAL SERVICES
Bob Wallace - Senior Editor

Ellen Messmer - Senior Correspondent
Phone: (202) 879-6752
Bill Burch - Washington Correspondent
Phone: (202) 879-6744
National Place
1331 Pennsylvania Ave. NW, Suite 505
Washington, D.C. 20004
Fax: (202) 347-2365

CLIENT/SERVER APPLICATIONS
Bob Brown - Senior Editor
Wayne Eckerson - Senior Editor

Peter Lisker - Senior Editor
2088 Union St., Suite 2
San Francisco, Calif. 94123
Phone: (415) 771-3530 Fax: (415) 771-2817

FEATURES
Features Editor
Charles Bruno
Jim Brown - Managing Editor
Susan Collins - Associate Features Editor
Kyle Nitzsche - Associate Features Editor
Dana Thorat - Features Intern

ART
Susan Champeny - Design Editor
Susan Slater - Design Editor

COPY DESK
Assistant Managing Editor - Production
Michelle Beaulieu
Karen Moltenbrey - Associate Editor
Jodi Cohen - Copy Editor
Amy Koulouris - Copy Editor
Laura Mascharka - Copy Editor

Assistant to the Editor
Cheryl Crivello

Editorial Assistant
Glenna Fasold

Contributing Editors
Daniel Briere, James Kobielus,
Mark Miller, Alan Pearce

Teletoons
Phil Frank, Joe Troise

Colin Ungaro, President/Publisher
Mary Fanning, V. P. Finance & Operations
Nanci Farquharson, Adm. Assistant

USER ADVISORY PANEL
Laurie Bride, Boeing Computer Services; **Tom Brophy**, United Parcel Service; **Roy Bruce**, The Coca Cola Co.; **Byron Comp**, Association of Banyan Users International/Marshalls, Inc.; **Dugal Easton**, Tele-Communications Association, Inc.; **Phillip Evans**, Perot Systems Corp.; **Len Evenchik**, The Commonwealth of Massachusetts; **Thomas Festa**, Liberty Brokerage, Inc.; **E.W. Bud Huber**, User Alliance for Open Systems/Hughes Aircraft Co.; **Michael Kaminski**, General Motors Corp.; **Michael Kilbane**, International Communications Association (ICA)/Diamond Shamrock; **Ron Kopitowsky**, Communications Managers Association (CMA)/Metropolitan Transportation Authority of New York State; **John Lynn**, ICA/Electronic Data Systems Corp.; **Charles Murray**, CMA/The Travelers Insurance Co.; **Henry Pfendt**, Eastman Kodak Co.; **Kenneth Phillips**, Committee of Corporate Telecommunications Users/Citicorp; **Richard Sidoli**, Morgan Stanley; **Laura Zahtila**, **NetWare Users International/Hughes LAN Systems, Inc.**; **Jane Videtich**, ICA/R.J. Reynolds Tobacco Co.; **Stanley Welland**, General Electric Co.; **Ronald West**, Association of Data Communications Users/Shearman & Sterling

Network World
161 Worcester Road
Framingham, MA 01701
Phone: (508) 875-6400 Fax: (508) 820-3467
MCI Mail - 390-4868

We'll give you the kind of treatment you deserve.

PTT We make it our business to make you feel at home when your telecommunications needs take you to Europe. After all, hospitality has been a Swiss tradition for centuries.

We understand the natural fear of things foreign. So we've established Swiss Telecom North America—staffed with Americans—to act as your liaison with the PTT.

And on the other side of the Atlantic we'll serve as your agent in charting a course through the Continent's fast-changing telecommunications regulatory maze. Using our connections at other European administrations and our high-speed digital links, we'll get your traffic anywhere it's going in Europe. Our recently expanded Leaseline Control Center in Berne makes it easy for you to get answers about the status of your network. It's staffed around the clock with people who know both engineering and English.

When you make Switzerland your hub, you're building your network on the most modern telecommunications infrastructure in Europe. And working with people to whom "Welcome" is not a foreign word.

SwissTelecom

To find out more, contact Tom Lamoureux, Swiss Telecom, N.A., Suite 600, 2001 L St. N.W., Washington, D.C. 20036. 1-800-966-1145.

Circle Reader Service #9

GROUPWARE
Buyer's guide

The time is ripe to pick groupware

The fruits of vendor efforts are abundant, and selecting the right group collaboration tool means probing the class distinctions.

BY JAMES KOBIELUS

Although group collaboration — or groupware — isn't often compared to a fruit salad, the comparison is, dare we say . . . ripe.

Both groupware and fruit salads are loaded with colorful, enticing products. But unlike a good, healthy fruit mix, the diversity of technologies and products that comprise group collaboration tools makes the purchasing process somewhat akin to comparing apples and oranges if users are not careful.

With so many tasty tidbits at hand, many customers are eyeing these products as they look to decrease time lost in inefficient business meetings and reengineer their business processes.

However, while there are a set of relatively mature high-end products as well as a cornucopia of specialized groupware products, users still need to be wary when entering a market that is so young and in such ferment.

Regarded until recently as a laboratory curiosity, groupware is moving into the mainstream of corporate networking, propelled in large measure by Lotus Development Corp.'s increasingly successful groupware product, Notes 3.0. Many major software vendors now offer groupware and are basing future product developments on the principles of group collaboration, coordination and information sharing.

Groupware means different things to many people. But it generally refers to software that provides at least some of the following capabilities: information base sharing, message filtering and management, computer conferencing, group scheduling and calendaring, work flow management and project/task management.

Groupware typically runs in a client/server or a peer-to-peer mode and enables end users to share information, such as calendars or documents, and cooperate in other ways. For instance, many groupware products enable managers to set up standard paths for certain documents to take as they circulate through an organization — dubbed work flow. Other common groupware features include the ability to hold a "computer conference," in which users of multiple nearby or geographically separated personal computers can share their screens and cooperatively develop documents.

Groupware software often coordinates access to a range of core services that are often provided by other software. For instance, groupware can use existing electronic mail, file sharing or database management systems. In other cases, the groupware will provide these services. Groupware can also link users of other applications — for instance, word processing or spreadsheets — if those applications support the appropriate application program interfaces (API).

The Short List

Group collaboration tools

- ✓ Digital Equipment Corp.'s TeamLinks
- ✓ Lotus Development Corp.'s Notes 3.0
- ✓ WordPerfect Corp.'s WordPerfect Office 4.0

Complete details about The Short List appear on page 52.

TALE OF TWO ENDS

This Buyer's Guide focuses primarily on high-end or multifunctional groupware products, which appeal to companies seriously committed to using networks to link dispersed project teams and reengineer business processes. High-end products Ä most notably, Lotus' Notes, WordPerfect Corp.'s WordPerfect Office 4.0 and Digital Equipment Corp.'s TeamLinks Ä provide such multifunctional collaboration environments.

These high-end groupware offerings provide collaboration over enterprise networks. They operate in distributed client/server network environments, provide wide-area message transport, support dial-in access by mobile users and come with robust application development tools.

High-end products typically support distributed information bases, wide-area messaging and bulletin boards. They generally operate over a wide range of operating systems, network operating systems (NOS), database management systems and transport protocols. High-end collaboration tools provide a shared, user-definable, project-information repository usually known as an information base but occasionally dubbed corporate memory.

One notch below the high-end groupware products are packages for a single local-area network or work group. These products run on a single departmental server or — in the case of Microsoft Corp.'s Windows for Workgroups 3.1 — on a peer-to-peer LAN. Examples include Chesapeake Computing, Inc.'s Paradigm VII, Da Vinci Systems Corp.'s Coordinator II, Windows for Workgroups and Syzygy Development, Inc.'s Syzygy 2.0. They provide similar features and functions to enterprise-oriented groupware and, in some instances, support gateways to public and private E-mail systems. However, they generally lack wide-area messaging capabilities and synchronization between multiple information bases.

The low end of the market is taken up by an expanding number of meeting-oriented groupware products. These products support collaboration in face-to-face meetings (see story, page 48). They allow users with networked PCs to write ideas, comments and other information in real time to a "public" space viewed by all present. The public space may be a large projection screen on the conference-room wall, or simply a window on each user's PC display. Human facilitators may be required to coach users in software functions and keep

Continued on page 48

Selecting groupware

Customers should apply the following criteria when evaluating multifunctional or specialized groupware products:

Platform: Products should integrate smoothly with current or future network hardware, operating environments, protocols, messaging transports, database management systems and applications.

Collaboration setting: Tools should support the geographic range and time frame for collaboration within a work group or enterprise setting. Some tools are designed to provide services over an enterprise network involving multiple sites, while others provide services only on a single local-area network.

Collaboration media: Products should support the requisite media of information exchange, such as multiuser database and file access, store-and-forward messaging and real-time computer conferencing.

Process tools: Offerings should provide the requisite tools for business-process design and monitoring, including group calendar and schedule management, document routing and tracking, and project management and control.

Ease of use and administration: Products should be easy to understand, use and administer with minimal training.

Price: Customers should evaluate whether offerings are worth the cost of acquisition, customization, implementation and user training, or whether similar capabilities could be provided more cost-effectively with existing applications.

BY JAMES KOBIELUS

Tools tailored to meetings

Meeting-oriented groupware provides a collaboration environment for gathering ideas and exchanging information within a group of individuals. Such products are sometimes referred to as "group decision-support systems." All support both local- and wide-area collaboration, although they are optimized for conference room settings.

Meeting-oriented groupware allows users with networked personal computers to write ideas, comments and other information in real time to a "public" space viewed by all present. The public space may be a large projection screen on the conference room wall or simply a window on each user's PC display.

Meeting-oriented groupware products supply various group decision-support tools to facilitate collaboration. For instance, Collaborative Technologies Corp.'s VisionQuest, SmartChoice Technology Corp.'s SmartChoice 1.1 and Ventana Corp.'s GroupSystems V provide software that supports interactive agenda setting, brainstorming, commenting, categorization, analysis, review, evaluation and voting. Corporate Memory Systems, Inc.'s CM/1 provides graphical hypertext tools for structuring group discussions into issues, positions and arguments.

GroupSystems V is being used to support the Clinton administration's Reinventing Government initiative, says Robert Tap, strategic management division chief for the Cambridge, Mass., office of the Department of Transportation (DOT).

Tap's division manages off-site "business-process redesign" sessions in which DOT personnel collaborate using networked laptop PCs that run GroupSystems V in conjunction with Novell, Inc.'s NetWare.

"At a recent brainstorming session in Virginia, we used the software to generate 150 ideas, which were printed out on the spot and were provided to participants," he says. The session was run by a meeting facilitator in cooperation with a "technographer," whose job was to set up team exercises on the fly within GroupSystems V.

VisionQuest and GroupSystems V allow moderators to establish a time-based agenda for each conference. Under GroupSystems V, for example, one can preschedule particular activities within the meeting. Users can move from one decision-support tool to another at a specified pace, as defined in advance by the moderator.

BY JAMES KOBIELUS

Continued from page 47

them focused on conference objectives.

These products include Collaborative Technologies Corp.'s VisionQuest, Corporate Memory Systems, Inc.'s CM/1, SmartChoice Technologies Corp.'s SmartChoice 1.1 and Ventana Corp.'s GroupSystems V.

There are also a number of groupware products that provide only a single function. There are several basic categories of specialized groupware products: computer conferencing, project management, work flow management and group scheduling — also known as time management. These typically provide a narrower range of functions than do the multifunctional groupware products, although many multifunctional products support these features as well. Refer to the Buyer's Guide chart beginning on page 50 for a survey of multifunctional and specialized groupware products.

Examples of specialized groupware products include Fujistu Networks Industry, Inc. DeskTop Conferencing and ON Technology Corp.'s Meeting Maker 1.5.

There are a handful of key guidelines to keep in mind when evaluating groupware products (see story, page 47). The product must support users' preferred desktop operating environments and fit into the existing net architecture. A good groupware product will provide a collaboration media that is acceptable to end users, and it will provide tools for structuring and enforcing group processes. The groupware product should be easy to use and administer. And finally, it must provide value-added collaboration capabilities that are well worth the price.

A good place to start the selection process is evaluating the groupware product's architecture and deciding whether it will truly meet an organization's needs.

ARCHITECTURE

The first step when evaluating groupware is to find products that run under all or most of the preferred desktop operating environments in one's company, whether those environments are DOS, Microsoft Corp. Windows, Macintosh, Unix or something else.

High-end and groupware products generally support multiple client types. Support for DOS is almost universal. Users of Microsoft Windows, OS/2, Unix and Macintosh also have plenty of options. One can even find groupware that runs on X Window System desktops — for instance, The ForeFront Group, Inc.'s Virtual Notebook System 3.0.

Some products run on mainframe and minicomputer operating systems, such as MVS and OS/400, for instance Verimation, Inc.'s Memo. Some users have found these cross-platform environments to be efficient means for linking and coordinating heretofore separate workgroups, such as Macintosh users and Unix gurus or Systems Network Architecture terminal users.

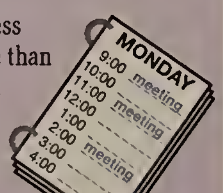
Managers evaluating the costs and benefits of groupware might consider these findings from the 3M Meeting Management Institute:

Managers spend 30% to 80% of their time in meetings.

Companies spend 7% to 15% of their personnel budgets on meetings.

There are 11 million business meetings per day and more than 3 billion meetings per year.

One Fortune 500 company estimated that it loses $71 million per year from ineffective meetings.



From an architectural standpoint, multifunctional groupware products layer value-added collaboration services on top of such underlying network facilities as file sharing, messaging and data/document management. Therefore, another critical consideration is whether the groupware product runs over the existing back-end network components, such as server operating systems, protocols and messaging transports.

Many users regard groupware principally as a value-added messaging service, so it is very important that the product one selects will work with existing client/server E-mail transports, including Message Handling System (MHS), cc:Mail or X.400. Groupware vendors either bundle third-party or proprietary messaging, database and other basic services with their products or interface with existing capabilities installed on users' networks.

Notes is based on two proprietary messaging transports, Notes Mail and cc:Mail. It provides a range of various E-mail gateways, including one to X.400-based systems. Notes also provides X.500-compliant hierarchical naming as its native means of identifying users. By contrast, WordPerfect Office also uses a proprietary messaging transport, dubbed WordPerfect Office Mail. WordPerfect has pledged to support the native message transport services in various NOSes, including Novell, Inc. NetWare Global Messaging and Banyan Systems, Inc. Intelligent Messaging.

WordPerfect Office supports distributed directory services between WordPerfect Office servers and can export X.400 addresses — rather than WordPerfect Office addresses — to external X.500-based directories.

Other plans call for integrating WordPerfect Office into Novell's NetWare Directory Service, Banyan's StreetTalk Directory Assistance and X.500 directories. DEC's TeamLinks also uses a proprietary transport messaging transport protocol, DEC Mailworks — formerly known as All-In-1 Mail. TeamLinks uses DEC's Distributed Directory Services to link Mailworks and other E-mail systems via an X.500 directory system.

The architectural similarities will grow over time as vendors provide support for a common set of de facto industry standards at the application, desktop, messaging transport, protocol and other network levels.

Lotus Notes 3.0 is the paragon of enterprise-oriented groupware, and one can expect to see its architecture adopted by other high-end vendors. Notes was designed from the ground up to be able to support far-flung, multisite organizations. Multiple Notes servers that can be kept in rough synchronization through periodic database replication across the wide area network. Dial-in users can easily identify and reconcile discrepancies between files on their laptops' hard drives and on various Notes servers. Discussions can be sustained at users' convenience on bulletin boards. Mail can be sent over the most efficient wide-area links through an alternate-routing feature. The hierarchical naming model within Notes is consistent with the global X.500 Directory Services standard.

However, each of the high-end packages has its own special approach to coordinating group collaboration. In a nutshell, Lotus' Notes is oriented toward database applications developed by users with forms automation, work flow and external data import tools. WordPerfect Office targets messaging applications developed by users with forms automation and work flow tools. DEC's TeamLinks is focused on third-party desktop applications that are customized and integrated by users with Windows development tools.

Tooltime

Many high-end products provide a core set of services that are available to other applications supporting the groupware's APIs. As groupware products take root in the corporate net, the need to integrate new products with existing groupware environments will only increase. Also, users committed to business-process reengineering should consider only those groupware environments that provide ample programming and customization tools.

Not surprisingly, the larger groupware vendors provide the richest set of application development tools. In fact, most large users customize these products to meet the needs of their organizations. Large users often develop in-house programs for use with Notes, NCR Corp.'s Cooperation 2.1, TeamLinks or WordPerfect Office.

Notes has achieved distinction as a full-fea-

Continued on page 51

Conferencing takes on varied forms

Conferencing is a generic term that refers to an application's ability to allow users to share the same file or bulletin board in real time — or synchronous — mode, or at different times in store-and-forward — or asynchronous — mode.

There are three basic types of conferencing: joint authoring, discussion groups and structured brainstorming.

Examples of high-end, multifunctional groupware environments that support joint document authoring include Digital Equipment Corp.'s TeamLinks and The ForeFront Group, Inc.'s Virtual Notebook System 3.0. Virtual Notebook System, while only available for Unix platforms, deserves consideration because it enables distributed teams to create multimedia notebooks of text, images, video, audio and pointers to other programs and files.

Joint authoring and hypertext linkages can be defined within The Forefront Group's Virtual Notebook files in synchronous or asynchronous sessions.

Discussion groups, in any form, are supported by DEC TeamLinks, Fischer International Systems Corp. EMC2/TAO LAN 3.3, Lotus Development Corp. Notes 3.0 and Verimation, Inc. Office Express, Inc.'s grapeVINE 3.2 allows discussion databases to be built around incoming documents, mail messages and news wire dispatches, thereby allowing groups to include new information in their discussions.

Synchronous discussion groups may be established over the LAN/WAN with Team Software, Inc.'s Channels, among others. This product allows users to engage in multiple, real-time network "chat" connections and to import the full text of these discussions to any document using Object Linking and Embedding in Microsoft Corp.'s Windows 3.1.

Several meeting-oriented systems allow teams to build project plans and other materials from structured brainstorming and other tools in a real-time, face-to-face setting. Most of these products also support asynchronous conferencing from users' desktops.

BY JAMES KOBIELUS

INTERNETWORK MANAGEMENT

Understanding SNMP and SNMPv2

According to IDC (International Data Corporation), the installed base of internetworking devices has been growing at an average annual rate of over 65% for the past four years.

With this explosive growth comes the need for network management systems to simplify management operations. The SNMP (Simple Network Management Protocol) has rapidly become the de facto standard for these management systems.

In this information packed one-day seminar, you will acquire a thorough understanding of the elements of an SNMP-based network management system, how to implement SNMP with your internetwork, plus the various enhancements such as the new message formats, improved error codes and security with SNMP version 2.

A special feature of this seminar are case studies, taken from live networks, and demonstrated with a Network General Sniffer® protocol analyzer.

DATES AND LOCATIONS

9/13/93	Denver, CO Embassy Suites
9/14/93	Dallas, TX Infomart
9/27/93	Boston, MA Cambridge Marriott
9/28/93	New York, NY Embassy Suites Broadway
9/29/93	Washington, DC ANA Hotel
10/13/93	Los Angeles, CA LAX Marriott
10/14/93	San Francisco, CA S.F. Marriott
10/15/93	Seattle, WA Westin
10/20/93	Atlanta, GA Marriott Perimeter Ctr.
10/21/93	Orlando, FL Omni Centroplex
11/16/93	Minneapolis, MN Marriott City Center
11/17/93	Chicago, IL Radisson/O'Hare
11/18/93	Pittsburgh, PA Greentree Marriott

Product names mentioned herein may be trademarks and/or registered trademarks of their respective companies.

NETWORK WORLD TECHNICAL SEMINARS

Official Sponsor;

AT&T NCR An AT&T Company **StarSENTRY™** *Enterprise Management Solutions*

REGISTER TODAY FOR THE SEMINAR NEAREST YOU!

CALL 800-643-4668

OR DIAL OUR FAX-BACK INFORMATION LINE FOR A COMPLETE SEMINAR OUTLINE AND REGISTRATION FORM

800-756-9430

When prompted request document #55.

Co-sponsored by; **COMPUTERWORLD**

ATTENDING THIS SEMINAR WILL HELP YOU . . .

- Understand the Agent/Manager model of network management.
- Compare and contrast the ISO, IEEE and Internet network management architectures.
- Learn how major vendors are supporting SNMP, including Apple Computer, Cabletron Systems, DEC, Hewlett Packard, IBM, NCR, Novell, and SunConnect.
- Learn the details of the three key elements of the Internet Network Management framework: the SMI, the MIB and the SNMP.
- Survey the key elements of Abstract Syntax Notation One (ASN.1), the language used to define SNMP message formats.
- Understand how TCP/IP and the related Internet protocols such as UDP and IP support SNMP.
- Learn how test equipment that supports the Remote Monitoring (RMON) MIB can assist with distributed LAN management.
- Understand the enhancements found in SNMPv2, such as Manager-to-Manager communications, the GetBulk Protocol Data Unit, and enhanced Security.
- Consider strategies for the coexistence of SNMP version 2 with existing SNMP version 1 systems
- Obtain key SNMP standards and documents without charge via the Internet.

YOU'RE IN GOOD COMPANY!

Following is a partial list of companies that have trained with *Network World*...

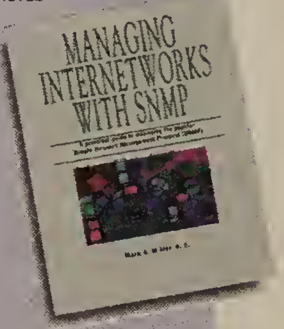
Dreyfus • Ameritech • AT&T Bell Labs • Motorola • Arthur Anderson • John Deere • Chipcom • New York Life • Bell Atlantic • Martin Marietta • Infonet • Miller Brewing • RJR Nabisco • Pratt & Whitney • Cabletron Systems • Nynex • Keystone • Dun & Bradstreet • NEC America • Federal Reserve Bank • Bank of America • ADP • Univ. of Wisconsin • EDS • Minolta Corp. • Delta Airlines • Dept. of Commerce • Toshiba • IBM • American Re • Rockwell • UCLA Medical Center • Ernst & Young • Northrop • AMGEN • American Express • Unisys • Dow Corning Corp. • Lockheed • Texas Instruments

Circle Reader Service #10

$395.00 registration fee includes:

Satisfaction 100% Guaranteed

- Comprehensive Seminar Workbook
- Copy of *Managing Internetworks with SNMP* by Mark A. Miller
- Reference diskette containing key SNMPv1 and SNMPv2 RFC documents
- Valuable Protocol Reference Guides for TCP/IP, SNMPv1 and SNMPv2
- Luncheon and break refreshments



(multiple attendee discounts available)

Note: If you can't attend, a full attendee materials kit is available for just $99.95!

WHO SHOULD ATTEND . . .

- Network managers
- Network designers
- Systems/Network analysts
- Network administrators or engineers

NETWORK WORLD TECHNICAL SEMINARS MAKE IT EASY FOR YOU TO ATTEND AND LEARN . . .

- One day intensive course minimizes time out of the office
- Multiple seminar dates and locations minimize travel costs
- Highest quality expert speakers — *Internetwork Management; Understanding SNMP and SNMPv2* is presented by Mark A. Miller, P.E. of Diginet Corp.
- Interactive format and comprehensive seminar materials give you information and ideas you can implement right away
- Luncheon and breaks provide you with excellent opportunities to network with your peers

Group collaboration tools

Company	Product	Platform	NOS support	Net transport support	Third party	Infobase data structures									Messaging		Messaging gateways						Conferencing			Process mgmt.			Support	Price
		D = DOS M = Macintosh O = OS/2 U = Unix W = Windows X = Other	M = LAN Manager N = NetWare S = LAN Server V = VINES	D = DECnet I = IPX/SPX N = NETBIOS O = OSI P = Named Pipes S = SNA T = TCP/IP	Application integration	Free-form text	Semistructured text	Structured text	Tagged text	Rich text	Compound documents	Binary files	Multimedia objects	Hypertext/media	Access from nonmail applications	Rule-based filtering	Other private E-mail	Public E-mail	Fax	Paging	Voice mail	Other	B = Bulletin boards W = Whiteboard	A = Authoring/editing B = Brainstorming	A = Annotation P = Polling/voting/rating	Time	Work flow	Project/task	C = Consulting O = On-site training N = Newsletter T = Toll-free hot line	
Advanced Management Solutions, Inc. (800) 397-6829	AllTime 1.0	D, M, O, U, W	M, N, S, V	T																						✔		✔	C, N, O, T	$199/user
Beyond, Inc. (617) 621-0095	Beyond Mail for Windows 1.0	D, W	M, N, S, V	I, N											✔	✔	✔	✔	✔	✔	✔		B				✔	✔	C, O, T	$995/10 users
Chesapeake Computing, Inc. (800) 899-2255	Paradigm VII	D	M, N, S, V	I, N	✔	✔		✔											✔				B			✔	✔	✔	C, O, T	$1,995/5 users
Chronos Software, Inc. (415) 920-6900	Enterprise 1.1	D	M, N, S, V																							✔		✔	C, O	$695/6 users
Collaborative Technologies Corp. (800) 856-6338	VisionQuest	D, W	M, N, S, V			✔									✔									A, B	A, P			✔	C, N, O, T	$9,900/file server $550/user
Computer Associates International, Inc. (800) 225-5221	CA-ForComment	D, X	N	D, I	✔							✔			✔									A, B	A		✔		O, N, T	(1)
Computron Technologies Corp. (800) 828-7660	EPIC/Workflow Management System 2.2	D, M, O, U, W, X	N	D, N, T																							✔		C, N, O, T	$50,000/base software
Corporate Memory Systems, Inc. (512) 795-9999	CM/1	U, W	M, N, S, V	D, I, N, O, S, T	✔			✔		✔				✔	✔								W	A, B	A, P				C, O	$1,500/user
Cross International Corp. (303) 440-7313	LAN Intercom 1.00	D, W	M, N, S, V	I, N											✔		✔												C, T	$49/10 users
CrossWind Technologies, Inc. (408) 335-4988	Synchronize 1.2	U		T	✔										✔		✔	✔								✔		✔	C	$100/user
Da Vinci Systems Corp. (919) 881-4320	Coordinator II	D, O, M	M, N, S, V	I, N, T			✔										✔	✔	✔	✔		✔		A, B	A, P	✔		✔	T	$7,500-$9,375/100 users
Delrina Corp. (800) 268-6082	Delrina FormFlow	D, M, W	M, N, S, V		✔			✔		✔			✔			✔											✔	✔	C, O, T	$1,840/10 users
	Delrina WinFax Pro for Networks	D, W	M, N, V	I, N	✔	✔	✔			✔			✔				✔		✔					A, B	A		✔		C, N, O	$1,999/25 users
Digital Equipment Corp. (800) 344-4825	TeamLinks	D, M, W, X	N	D, T	✔	✔	✔		✔	✔	✔	✔			✔		✔	✔	✔		✔		B, W	A, B		✔	✔		C, O, T	$440-$550/server
Elan Software Corp. (310) 454-6800	GoldMine	D	M, N, S, V	I, N		✔		✔											✔					A	A	✔		✔	C, N, O	$895/5 users
Enable Software, Inc. (518) 877-8600	Higgins Group Productivity	D, O	N, S, V	N	✔	✔										✔	✔	✔	✔							✔	✔		C, N, O, T	$695/8 users
Farallon Computing, Inc. (510) 814-5000	Timbuktu	D, M, W	I, M, N, T, V																					A					C, T	$999/10 users
FileNet Corp. (800) 345-3638	WorkFlo Business System	D, U, W	M, N, S, V	I, T	✔	✔	✔	✔		✔	✔	✔	✔														✔	✔	C, N, O	(1)
Fischer International Systems Corp. (813) 643-1500	EMC2/TAO LAN 3.3	D, M, O, U, W, X	M, N, S, V	I, N, S													✔	✔	✔				B			✔	✔	✔	C, N, O, T	$1,100/25 users
	WorkFlow 2000	D, M, O, U, W	M, N, S, V	I, N, S, T	✔									✔		✔	✔	✔	✔				B, W	A, B	A	✔	✔	✔	C, O, T	$5,000/site
ForeFront Group, Inc. (713) 961-1101	Virtual Notebook System, 3.0	M, U, W, X		T	✔	✔	✔			✔	✔		✔	✔									W	A	A				C, O	$21,450-$21,950/10 users
Fujitsu Networks Industry, Inc. (800) 446-4736	DeskTop Conferencing	D, W	N	I	✔										✔								W	A, B	A				C, N, O, T	$248/user
Futurus Corp. (404) 392-7979	Futurus Team 2.1	D, W	M, N, S, V	I, N	✔			✔									✔	✔	✔	✔						✔		✔	O, N, T	$4,995/100 users
Group Technologies, Inc. (703) 528-1555	Aspects 1.03	M		T																			W	A, B	A				C, O, T	$695/10 users
Keyfile Corp. (603) 883-3800	Keyfile 2.1	D, O, W	M, N, S, V	N, T	✔	✔	✔	✔				✔	✔				✔	✔	✔							✔	✔	✔	N, T	$995/user
Lotus Development Corp. (617) 577-8500	Notes 3.0	D, M, O, U, W	M, N, S, V	D, I, N, S, T	✔	✔	✔	✔		✔	✔	✔	✔	✔	✔		✔	✔	✔	✔			B	A, B	A		✔		C, N, O	$495/user
Microsoft Corp. (800) 227-4679	Windows for Workgroups 3.1	D, W	M, N, S, V	D, I, N, O, P, S, T	✔											✔	✔	✔	✔	✔	✔					✔			N	$700/2 DOS users (starter kit)
	Schedule+ for Windows 1.0	M, W	M, N, S, V	I, N, T	✔												✔					✔				✔		✔	C	$195/server (2)

Group collaboration tools

Company	Product	Platform	NOS support	Net transport support	Third party	Infobase data structures									Messaging		Messaging gateways						Conferencing			Process mgmt.			Support	Price
		D = DOS M = Macintosh O = OS/2 U = Unix W = Windows X = Other	M = LAN Manager N = NetWare S = LAN Server V = VINES	D = DECnet I = IPX/SPX N = NETBIOS O = OSI P = Named Pipes S = SNA T = TCP/IP	Application integration	Free-form text	Semistructured text	Structured text	Tagged text	Rich text	Compound documents	Binary files	Multimedia objects	Hypertext/media	Access from nonmail applications	Rule-based filtering	Other private E-mail	Public E-mail	Fax	Paging	Voice mail	Other	B = Bulletin boards W = Whiteboard	A = Authoring/editing B = Brainstorming	A = Annotation P = Polling/voting/rating	Time	Work flow	Project/task	C = Consulting O = On-site training N = Newsletter T = Toll-free hot line	
Microsystems Software, Inc. (508) 879-9000	CaLANdar	D, W	M, N, S, V												✔		✔									✔			O	$595/10 users
Mustang Software, Inc. (800) 999-9619	Wildcat 3.9	D	M, N, S, V	I, N												✔	✔	✔	✔				B	B					N	$249/unit
NCR Corp. (803) 739-7693	Cooperation 2.1	D, U	M	N, O, P, S, T		✔		✔		✔	✔	✔			✔		✔	✔								✔	✔		C, O	$2,000/user
	ProcessIt 1.0	D, U																									✔	✔	C, O	$1,245/user
Northern Telecom, Inc. (800) 667-8437	Visit Video	D, M, W																			✔		W		A				O, N, T	$3,999/unit
Office Express, Inc. (404) 977-3126	grapeVINE 3.2	D, M, O, U, W	M, N, S, V	N, P, T	✔	✔						✔			✔		✔	✔						A, B	A, P		✔	✔	C, O	$50,000/50 users
ON Technology Corp. (800) 548-8871	Meeting Maker XP 1.0	M, W	N	I, N											✔											✔		✔	T	$1,195/10 users
	Meeting Maker 1.5	M	N																							✔			T	$895/10 users
	Instant Update 1.0	M	N			✔	✔								✔									A	A				T	$895/5 users
Phase II Software Corp. (617) 937-0256	ClockWise 2.0	D, U, W,	M, N, S, V	D, I, N, O, T			✔																		A	✔		✔	C, O	$249-$759/5 users
Powercore, Inc. (818) 468-3737	Network Scheduler 3 1.1	W	M, N, S, V												✔	✔										✔		✔	C, N, O, T	$695-$1,195/25 users
ProActive Software, Inc. (415) 691-1500	Support Advantage 2.0	M, U, W	M, N	T	✔	✔	✔	✔			✔	✔	✔		✔	✔	✔	✔	✔								✔	✔	C, O, T	$40,000/10 users
Quality Decision Management, Inc. (508) 688-8266	Quality At Work 2.0	O, W, X	M, N, S, V	I, N	✔	✔				✔	✔				✔	✔								A, B	P		✔	✔	C, O	$12,825/20 users
RTZ Software (408) 252-2946	The Virtual Meeting/Classroom/Auction	M		D, T	✔																		W	A, B	A, P				C, N, O, T	$3,600/10 users
SmartChoice Technologies Corp. (201) 379-2306	SmartChoice 1.1	D, M, O, U, W		T	✔					✔			✔		✔	✔	✔	✔	✔		✔			B	A, P	✔	✔	✔	C, N, O, T	$1,895/user
Strategic Marketing Associates (310) 378-7632	QED Office 2.02	D, O, W	M, N, S, V	D, I, N, O, S	✔	✔	✔	✔							✔		✔	✔	✔			✔		A	A	✔		✔		$1,495/20 users
SunSolutions (415) 336-4567	ShowMe 1.1	U		T	✔	✔									✔								W	B	A				T	$2,870/10 users
SuperOffice Corp. (617) 275-2140	SuperOffice 3.0	D, M, O, W	M, N, S, V		✔												✔	✔	✔					A	A	✔	✔	✔	C	$1,995/10 users
SuperTime, Inc. (416) 764-3530	SuperTime 1.2	D, W	M, N, S, V	I, N, T	✔	✔	✔	✔							✔											✔		✔	T	$2,495/24 users
Syzygy Development, Inc (404) 662-5362	Syzygy 2.0	D, M	M, N, S, V	D, I, N, S, T	✔	✔		✔	✔		✔				✔		✔	✔	✔					A	A	✔	✔	✔	C, O	$1,695/10 users
Team Software, Inc.	Channels	D, W	M, N, S	D, I, N, T	✔	✔	✔	✔	✔	✔	✔	✔	✔		✔		✔						B	B	A			✔	C, O	$395/10 users
Ventana Corp. (602) 325-8228	GroupSystems V	D	M, N, S, V				✔																	A, B	A, P	✔		✔	C, N, O, T	$24,900/20 users
Verimation, Inc. (800) 967-6366	Memo	D, M, O, W, X	M, N, S, V	I, N, S	✔	✔				✔		✔			✔		✔	✔	✔	✔		✔	B	A	A	✔	✔		C, N, O	$100/user
WordPerfect Corp. (800) 451-5151	WordPerfect Office 4.0	D, M, O, W	M, N, S, V	N	✔	✔	✔	✔								✔		✔	✔				B			✔	✔	✔	C, N	$495/5 users $295/server

Products highlighted by color were selected for The Short List.

NOS = Network operating system

FOOTNOTES:
(1) Vendor declined to provide information.
(2) Requires separate purchase of Microsoft Mail for PC Networks.

SOURCE: JAMES KOBIELUS, NMI SYSTEMS, INC., FAIRFAX, VA.

Continued from page 48

tured application development environment, which Lotus continues to extend in scope and power. Information-sharing, routing and work flow applications are developed visually by designing forms and views, with no programming needed other than a simple "@Function" language that any Lotus 1-2-3 user would be familar with. All Notes design functions are accessed through a single design menu option. If a user is interested in how an application works, it can be readily inspected through use of the design menu. Notes also provides template applications that can serve as the basis for user-customized applications.

Lotus reportedly plans this fall to release an application development environment that will allow Notes users to extract and integrate structured data from more than 40 databases. Notes applications will use Lotus DataLens technology and Microsoft's Open Database Connectivity (ODBC) specification to filter and translate data from external sources, including other Lotus applications that run under Windows. Users will be able to build simple applications visually and more complex applications using Lotus Script, an object-oriented scripting language.

WordPerfect Office, for instance, includes a powerful macro language to automate keystrokes and functions within and across applications. The macro language offers conditionals, variables and other programming functions. It allows applications to be forms- and mail-enabled within WordPerfect Office, and includes portable C language routines and libraries. WordPerfect says the future direction of macros will embrace scripting and intelligent work flow capabilities between applications across platforms.

DEC's TeamLinks provides a well-documented API that allows programmers to write code in Visual Basic, C, C++ or any other

Continued on page 52

Continued from page 51

Windows programming language. TeamLinks also provides templates that serve as the basis for user-customized applications, as well as integrating with existing desktop applications. DEC's TeamRoute Software Development Kit for Visual Basic allows users to employ Windows forms-based tools in routing applications. Users can utilize a range of Windows tools — Dynamic Data Exchange, Dynamic Link Libraries and Object Linking and Embedding — to customize third-party Windows applications under TeamLinks.

Notes has a particularly rich set of third-party applications available. For example, there are two brainstorming products that run as modules within Notes: Quality Decision Management, Inc. Quality at Work 2.0 and Collaborative Technologies VisionQuest. As Notes and similar products gain adherents, other software vendors will no doubt seek to integrate their high-end and specialized applications into these environments.

While selecting a product whose architecture meshes well with the user's organization is a must, another key factor is whether the groupware environment supports the media within which users prefer to work, communicate and maintain files. Users will only accept a collaboration environment if its special approach to information exchange fits into their work styles. Groupware environments allow users to build project-information repositories using one or more of the following media: information base sharing, messaging and conferencing.

INFORMATION BASES

Information bases — also known as infobases — are pools of shared documents, databases and other information. High-end groupware products typically allow work groups to accumulate shared information bases consisting of diverse information types, including free-form text (ASCII documents), semistructured text (E-mail messages), structured text (relational database files), tagged text (Structured Generalized Markup Language files), compound documents (desktop publishing files with text and embedded graphics) and binary files (bit-mapped graphics).

The infobase consists of a database and a set of tools and gateways to other databases. Notes uses a proprietary distributed information base known as Notes Object Store. It supports gateways through the Lotus DataLens/Notebook software and the Windows ODBC technologies to a wide range of third-party SQL-based DBMSs.

Types of access that groupware tools provide to other files and applications

- Load and run third-party or custom applications.
- Automatically launch into a file and its associated application from a directory screen.
- View and search the contents of files without loading the applications that created them.
- Edit a file and save it in its original format.
- Store commentary and graphical annotations about the file within the file itself.
- Build hypertext cross-references between files.
- Provide flexible file import and export vis-a-vis third-party applications.
- Attach external files to messages from the groupware environment.

WordPerfect Office also uses a proprietary distributed information base, known as WordPerfect Message Store. Message Store has gateways through WordPerfect InForms, a bundled electronic forms routing product to many SQL-based DBMSs, including from those from Sybase, Inc., Oracle Corp., Novell and Microsoft, and to others, such as dBase, Paradox and DataPerfect. DEC TeamLinks is also based on a proprietary distributed information base, known as File Cabinet. Gateways are provided through DEC AccessWorks, DECQuery and DECReport to SQL-based DBMSs from DEC, IBM, Oracle and other vendors.

One key technique for infobase sharing is to provide integrated access to existing applications and information across the network. Several groupware products provide varying degrees of integration with third-party applications. For instance, Notes, TeamLinks and NCR's Cooperation have strong integration with third-party applications. Each of these products provides access to existing applications through a desktop shell that sits on top of the client operating environment.

TeamLink's access to external applications is an attractive feature, says Richard Palmer, manager of data services at the San Diego sheriff's department, who is evaluating the software as a client/server stepping stone from DEC's host-based All-In-1 environment. It would allow users to continue using their familiar word processors, spreadsheets and other office-productivity tools. It would also give him the flexibility to use third-party applications that prove superior to those included in TeamLinks or All-In-1.

Users should request that groupware vendors demonstrate the level of access they provide to other applications and their files. For instance, some products are only able to read files in ASCII format while others can open a file from a third-party application, edit it and save it in the orignal file format (see graphic, this page).

Another infobase-sharing technique is for vendors to bundle specialized workgroup database applications within the groupware environment. Almost all groupware vendors bundle some specialized productivity applications in their environments. Notes, for example, includes contact managers — electronic card files — and correspondence tracking tools.

Other bundled applications often included in multifunctional groupware products include address books, calendars, card files, client trackers, contact managers, correspondence trackers, directories, expense tracking systems, financial managers, message centers, project management systems, sales trackers, schedulers, telephone logs and to-do lists.

Standard & Poor's Corp. (S&P) of New York uses Elan Software Corp.'s GoldMine primarily for its contact-management applications, says Maureen O'Hare, senior systems manager. "GoldMine was complex enough to serve the needs of all our users," she says. The software is installed on a 700-user Banyan VINES LAN. S&P personnel use GoldMine to maintain lists of contacts, customers, sales transactions, seminar attendees, publications subscribers and many other bits of information. The system's fax gateway and scheduling features are also used.

MESSAGING SERVICES

The infobase forms the repository of data accessed by users in a group collaboration environment. Messaging, however, is a fundamental service of most groupware environments, both for interpersonal communications and for routing documents, electronic forms, task assignments, schedule requests and other digital cargo.

The Short List:
Groupware

The Short List highlights enterprise-oriented groupware products that Network World *recommends you examine during the selection process. Products were selected based on their information bases, messaging services, remote access capabilities, bulletin boards, third-party applications support and development tools.*

■ **Digital Equipment Corp.'s TeamLinks.** TeamLinks provides an impressive group of "infobase" sharing, messaging, time management, bulletin board, group authoring, work flow and other applications. TeamLinks is a strong entry by DEC in the client/server office automation market.

One key area of strength is its plug-and-play integration with a wide range of third-party desktop applications, as well as with DEC's VAX-based All-In-1 office automation environment. TeamLinks provides application program interfaces (API) that allow programmers to write code in Visual Basic, C, C++ or any other Windows programming language. Remote users can access TeamLinks electronic mail, files, schedules and other services over asynchronous, X.25, or Local Area Transport connections.

■ **Lotus Development Corp.'s Notes 3.0.** Notes is the leading groupware package and the standard against which all other systems are measured. It provides a rich set of templates, APIs and other tools for building custom multimedia work group applications.

It sports a broad set of information base data structures and options. Messaging capabilities are embedded in all Notes applications, and E-mail can be sent over the most efficient wide-area links through an alternate-routing feature as well as to non-Notes users over a range of E-mail and facsimile gateways. However, rules-based message filtering is not supported.

Multiple Notes servers are synchronized through periodic database replication across the wide-area network. Dial-in users can easily identify and reconcile discrepancies between same-name files on their hard drives and Notes servers. Discussions can be sustained at users' convenience on bulletin boards. Imaging and text-retrieval applications can be built with third-party technology incorporated into Notes.

A growing assortment of Lotus and third-party applications are now available for the Notes environment, and many more are under development.

■ **WordPerfect Corp.'s WordPerfect Office 4.0.** WordPerfect Office is a widely accepted, well-architected collaboration environment. Its capabilities run the groupware gamut and include computer conferencing/bulletin boards, rules-based message management, database sharing, group scheduling and calendaring, work flow management, electronic forms routing and task management.

A full assortment of APIs are supplied to access WordPerfect Office's messaging, directory, calendaring, scheduling and task-management functions. Third-party applications can be launched through the WordPerfect Office shell. Remote users can set filters to determine which information they want to download to their laptop mailboxes.

Most enterprise- and work group-oriented products provide E-mail either through a proprietary capability or through links with server-based MHS, cc:Mail, X.400 or other third-party messaging transports. Gateways are often provided to other private and public E-mail systems. A growing number of vendors also provide gateways to facsimile, paging and voice-messaging services.

An important emerging feature in many products is embedded messaging, which enables users to send and receive mail and documents from within non-mail applications. Embedded messaging will eventually be a standard feature in all groupware environments.

Customers should ask vendors how soon their groupware products will support emerging specifications. The key specifications for integrating desktop applications with back-end mail transports include Lotus's Vendor-Independent Messaging (VIM), Microsoft's Messaging Application Programming Interface (MAPI) and Apple Computer, Inc.'s Open Collaborative Environment (OCE).

Lotus Notes currently supports the VIM standard for mail-enabled applications. WordPerfect has pledged to support VIM, MAPI and OCE standards for mail-enabled applications.

These standards are still very much in a state of flux, and users should not depend on using them as they are currently constituted. However, they do hold promise. Support for these mail-enabling standards could emerge as an important product differentiator in the future.

Another important feature is rules-based message filtering, which is provided in a growing number of products, including Beyond, Inc. Beyond Mail for Windows 1.0 and Microsoft Windows for Workgroups 3.1. This feature allows one to automatically forward, file and otherwise dispose of incoming messages based on sender, subject, contents and other factors.

Rule-based filtering is one of the new features in WordPerfect Office 4.0 that appeals to Brandt Ball, manager of information systems at Scene Three, Inc., a television production company in Nashville. "The rules feature allows you to do anything — forward, auto-reply, attach a file — to any item received within WordPerfect Office. Filtering can be performed on more than just mail. It can be applied to schedules, tasks and notes as well."

Neither DEC TeamLinks, Lotus' Notes nor NCR Cooperation support rules-based filtering now.

GOING WITH THE WORK FLOW

While the infobase and the messaging system are the enabling technologies for group collaboration, many customers look to these

FREE INFORMATION

on the Products and Services Advertised Throughout Network World

FREE INFORMATION

NETWORK WORLD
LEAD SERVICE

▶ Issue date 8/9/93
Card must be received by 11/15/93

☐ **URGENT**

1. Action requested
1 ☐ Request for sales call
2 ☐ Request for proposal
3 ☐ Request for information

2. Purchase timeframe
4 ☐ Within 60 days
5 ☐ Within six months
6 ☐ Within one year

3. Scope of purchase responsibility
7 ☐ Enterprise wide
8 ☐ Departmental

4. Purchase influence/number of sites
9 ☐ one site
10 ☐ 2-9 sites
11 ☐ 10-20 sites
12 ☐ 21+ sites

▶ Name
Title
Company
Street
City State Zip
Phone Fax

▶ **DISPLAY ADVERTISING:** 1 2 3 4 5 6 7 8 9 10 11 12
13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66
67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84
85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102
103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120
121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138
ACTIONCENTER: 139 140 141 142 142 143 144 145 146 147 148 149 150 151
152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 170
171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188
189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206
MARKETPLACE: 206 207 208 209 210 211 212 213 214 215 216 217 218 219

NETWORK WORLD
LEAD SERVICE

▶ Issue date 8/9/93
Card must be received by 11/15/93

☐ URGENT

1. Action requested
1 ☐ Request for sales call
2 ☐ Request for proposal
3 ☐ Request for information

2. Purchase timeframe
4 ☐ Within 60 days
5 ☐ Within six months
6 ☐ Within one year

3. Scope of purchase responsibility
7 ☐ Enterprise wide
8 ☐ Departmental

4. Purchase influence/number of sites
9 ☐ one site
10 ☐ 2-9 sites
11 ☐ 10-20 sites
12 ☐ 21+ sites

▶ Name
Title
Company
Street
City State Zip
Phone Fax

▶ DISPLAY ADVERTISING: 1 2 3 4 5 6 7 8 9 10 11 12
13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66
67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84
85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102
103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120
121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138
ACTIONCENTER: 139 140 141 142 142 143 144 145 146 147 148 149 150 151
152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 170
171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188
189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206
MARKETPLACE 206 207 208 209 210 211 212 213 214 215 216 217 218 219

Check Out the Latest Products and Services from Network World!

NetDraw™

With our NetDraw™ clip art library, you'll have access to over 170 professionally drawn symbols for computing, WANs, LANs, telephony, personal computing, and patching and cabling. Available for DOS®, Windows®, and MAC®. Call to order your copy today!

NETWORK WORLD TECHNICAL SEMINARS

Stay current on critical networking issues in a convenient and high quality forum. Sign up for a one-day intensive *Network World Technical Seminar*. Call today for seminar topics and locations and to be put on our priority mailing list.

NETWORK WORLD INSTRUCTIONAL VIDEOS

With *Network World's Instructional Video Packages* you can now train your staff cost-effectively and at their own pace. Tapes created in association with Learn PC. Call today for video package pricing and topics.

NetText™ OnLine

Get full text retrieval of *Network World* in an on-line environment with a subscription to NetText™ OnLine. Call today for your start-up kit. Available for DOS®, Windows®, and MAC® platforms.

For more information, call 800-643-4668 or fill out the back of this card and return today.

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO.716 PITTSFIELD, MA

POSTAGE PAID BY ADDRESSEE

NETWORK WORLD

The Newsweekly of Enterprise Network Strategies

P.O. Box 5090
Pittsfield, MA 01203-9838

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO.716 PITTSFIELD, MA

POSTAGE PAID BY ADDRESSEE

NETWORK WORLD

The Newsweekly of Enterprise Network Strategies

P.O. Box 5090
Pittsfield, MA 01203-9838

Name______________________________
Company___________________________
Address___________________________
City _____________State ______ Zip ________
Tel______________Fax_______________

Send Me Information About:

☐ NetDraw™ ☐ NWW Technical Seminars ☐ NWW Instructional Video Packages ☐ NetText™ OnLIne

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO.866 FRAMINGHAM, MA

POSTAGE PAID BY ADDRESSEE

Special Projects Division
Network World, Inc.
161 Worcester Road
Framingham, MA 01701-9525

products to provide new ways to organize work flow throughout their organization and thereby achieve new levels of efficiency and control. Many of these products provide a powerful platform for business process reengineering, using one or more of the following capabilities: time management, work flow management and project/task management.

Group calendar and schedule management may be the single most compelling groupware application for many users. Calendar and schedule management are basic features in many multifunctional environments and are provided by many excellent specialized tools, as well. Notes, however, has no bundled calendar and schedule management component, although this capability may be provided by accessing Lotus' Organizer product, a separate product, through the Notes desktop shell.

Most groupware products with time-management components allow users to view calendars for groups, individual people, conference rooms and other scarce resources, identify time slots when people or facilities are available, and submit a meeting or reservation request.

A growing number of these products use embedded E-mail to transmit meeting requests, RSVPs, confirmations, reminders and cancellations.

Some of these products also support gateways to scheduling systems running under IBM's Professional Office System (PROFS), DEC's All-In-1 and other host-based products. For example, WordPerfect Office has gateways to PROFS and Verimation Memo. Powercore, Inc. Network Scheduler has gateways to DEC's All-In-1 and TeamLinks. Microsoft Windows for Workgroups has a gateway to PROFS.

Work flow management — the automated routing, review, revision and tracking of documents, business forms and other information — is supported by a growing number of multifunctional and specialized groupware products.

Some groupware products allow business people, analysts or in-house software developers to graphically define the flow of documentation, decisions and activities throughout the enterprise (see story, this page).

Rather than roll their own work flow capabilities, some vendors — including Lotus — are using tools provided by Action Technologies, Inc., Reach Software, Inc. and other software developers that specialize in work flow. Many vendors are relying on MHS, X.400 or other E-mail transports as the back-end service for store-and-forward routing across the LAN/-WAN.

WordPerfect Office 4.0 includes two well-regarded work flow management features. Ordered message distribution allows users to send a message to a group of people one by one. After the first person receives the message, it is passed to the next person on the routing list. Electronic forms distribution allows forms designed in WordPerfect InForms, a separate software package, to be distributed as attachments to messages sent by WordPerfect Office users.

The ultimate process control capability is networked group project/task management. Ideally, such functions allow one to manage an entire project life cycle on-line by defining project objectives, handing out assignments, scheduling personnel, monitoring progress, discussing issues and receiving task-completion reports.

Many groupware products have basic project/task management capabilities, in the form of group to-do lists, task assignment, due-date reminders and task-completion reporting. The most complete project-management capabilities are provided by Chronos Software, Inc.'s Enterprise 1.1 and Syzygy Development's Syzygy 2.0.

These are the first wave of project management tools developed specifically for network environments. It's only a matter of time before mainline project-management tool vendors will incorporate embedded E-mail and other groupware features in their products.

GROUP RATES

Most groupware products are priced on a per-user basis, generally in increments of 5, 10, 20, 25, 50 and 100 users per server. The products range in price from less than $100 per user — for example, Verimation Memo and WordPerfect Office — to more than $2,000 per user for NCR's Cooperation and ProActive Software, Inc. Support Advantage 2.0. Price comparisons are meaningless unless limited to products with similar architectures and feature sets. Many vendors provide quantity discounts as more servers or clients are added. Some provide consultation, customization and systems integration at a separate price, while others throw it in for the cost of initial acquisition.

Products listed in the Short List on page 52 are priced by user, by server or using a combination of both per-user and per-server pricing. Lotus' Notes is priced at $495 per user. WordPerfect Office is priced at $495 for five users plus $295 per server. DEC TeamLinks is priced at $440 to $550 per server.

RAPID CHANGE

Change is the only constant in the groupware market. In fact, the term "groupware" may become obsolete before long. By the year 2000, many of these functions will be provided within LAN/WAN operating environments and applications.

One of the main trends in the software industry is to "group-enable" PC applications by integrating them with back-end network services, such as electronic messaging, document routing and database sharing. Perhaps the most visible result of this trend will be inclusion of "send mail" and "receive mail" functions in most desktop applications, such as word processors, spreadsheets and personal information managers.

The growing acceptance of a few key messaging standards — X.400-based E-mail and X.500-based global directory and naming services — and the current drive to create standards for interoperability between different vendors' groupware and other end-user applications will open up the groupware market. However, the increasing domination of a the groupware market by a few high-end environments such as Notes and WordPerfect Office should raise a red flag. Customers should perhaps be wary of betting their business on multifunctional groupware environments that may turn out to be commercial dead ends.

Feeling a bit overwhelmed by the variety and complexity of groupware offerings? Don't fret; it's only normal. Even groupware experts have trouble keeping current with this fast-changing marketplace. When evaluating groupware products, it's very important to keep one's priorities straight. Focus on specific business applications and resist the temptation to invest in the technology because it's trendy or state-of-the-art.

Most important, ask groupware vendors to demonstrate or trial their products in live settings with real users. Your colleagues will want to break in the products for a few weeks or months to see if it grows on them — or cramps their collective work style.

➾ Kobielus is a *Network World* contributing editor and a telecommunications analyst with NMI Systems, Inc., a consulting, systems integration and outsourcing firm in Fairfax, Va. He can be reached at (703) 922-6829.

Notes eases management

One intriguing work flow environment is Quality Decision Management, Inc.'s Quality At Work 2.0, which runs as a module within Lotus Development Corp.'s Notes. The product provides a structured process for addressing customer complaints or concerns within a distributed work environment, among other things.

Customer service employees route customer calls to the person who is best able to handle the problem. The document is automatically routed back to the person who initially answered the call. This feedback loop allows the originator to respond to the source of the complaint or concern.

One user who swears by Quality at Work is Ed Messerly, assistant regional administrator at the U.S. General Services Administration in San Francisco. Messerly uses Quality at Work routing forms to support asynchronous brainstorming, polling and concurrence development among 225 GSA personnel throughout the western U.S., including Alaska and Hawaii.

The product is an invaluable coordination tool, he says, because it can send an action item directly to team members' personal electronic mail boxes and to a public database in which members' unfulfilled commitments are visible to everyone.

BY JAMES KOBIELUS

Users reach consensus

Lotus Development Corp.'s Notes and WordPerfect Corp.'s WordPerfect Office are the most widely implemented groupware products among 100 *Network World* readers polled in a recent survey.

When asked what they like about the products, readers generally cited Notes' wide array of tools and its support for a broad range of third-party applications. They cited WordPerfect Office's strong service and support as well as its ease of use.

Workstations running groupware

No. of workstations or PCs	Percentage of respondents using groupware	
	Today	In 1 year
10 or fewer	12	2
10-30	16	14
31-50	10	9
51-100	19	23
101-200	16	14
201-plus	27	38
Total respondents	69	96

SOURCE: FOCUS DATA, INC., FRAMINGHAM, MASS.

The survey, conducted by Focus Data, Inc., involved 60 readers who currently use a groupware product and 29 who are evaluating groupware with the intent to purchase.

Of the 60 users, 27% use Notes, 20% use WordPerfect Office and the rest were divided among 21 other groupware packages. Of the 29 readers who are evaluating groupware, 12 are evaluating Notes and seven WordPerfect Office, while the rest are looking at other packages.

"Notes supports multiple platforms like Sun and Hewlett-Packard, and it also supports third-party products better," said one reader. "Through VIM, Notes will support Microsoft Corp. Microsoft Word and Lotus 1-2-3, whereas WordPerfect Office is much more self-contained."

"I would select Notes because of the number of third-party add-ons, because it is a relatively mature product and because [Lotus] has a lot of experience supporting sites," another reader said.

However, several readers said Notes costs too much and is too difficult to set up and administer.

Many readers praise WordPerfect's service and support for WordPerfect Office users. "We are very pleased with WordPerfect Office," said one reader. "All of its offerings are integrated, and I especially like the new version, 4.0. Also, they offer fantastic service and support."

Added another reader, "I would select WordPerfect Office because of its customer support."

Several, readers said they appreciate the enhancements offered in WordPerfect Office 4.0. "The new version will fill in such gaps as [integration with other] mail systems and group scheduling, which are very important to people here," a reader said. "Also, service and support are important issues, and WordPerfect is one of the few companies where you actually get to talk to people."

Groupware selection criteria
Based on highest possible score of 10

Criteria	Importance rating	Satisfaction rating
Ease of use	9.0	8.1
Ease of administration	8.6	7.8
Conformance to standards	8.5	7.9
Service/support	8.3	8.0
Breadth of functions	7.7	7.6
Range of operating environments	7.7	7.7
Price	7.2	8.0
Application development tools	6.5	7.1

SOURCE: FOCUS DATA, INC., FRAMINGHAM, MASS.

BY KYLE NITZSCHE

Nitzsche is an associate features editor for *Network World.*

Network World Advertising
Colin Ungaro - President/Publisher
Thomas J. Wilson - Vice President, Advertising Director
Debra Mahler - Adm. Assistant/Sales
161 Worcester Road, Framingham, MA 01701
(508) 875-6400/FAX: (508) 879-3167

Sales Offices
BOSTON
Donna Pomponi, District Manager
Eleni Brisbois, Sales Assistant
161 Worcester Road, Framingham, MA 01701
(508) 875-6400/FAX: (508) 651-1853
NEW YORK/N. NEW JERSEY
Joan Daly, Eastern Regional Manager
Marlene Levis, Sales Assistant
365 W. Passaic St., Rochelle Park, NJ 07662
(201) 587-0090/FAX: (201) 712-9786
S. NEW JERSEY/PHILADELPHIA/D.C.
Jacqui Mita DiBianca, District Manager
Patricia DiBiase, Sales Assistant
365 W. Passaic St., Rochelle Park, NJ 07662
(215) 834-1390/FAX: (201) 712-9786
CHICAGO
Dan Gentile, District Manager
Anna Gabriel, Sales Assistant
1011 E. Touhy Avenue, Suite 550
Des Plaines, IL 60018
(708) 297-8855/FAX: (708) 827-9159
SAN FRANCISCO
Lisa Hall, District Manager
Sandra Kupiec, District Manager
Beverly Davis, Sales Assistant
894 Ross Drive, Suite 200, Sunnyvale, CA 94086
(408) 541-8630/FAX: (408) 541-8640
Kim Schackel, CBC, National Acct. Mgr., Western Region
2443 Fillmore Street, Suite 427, San Francisco, CA 94115
(415) 928-3589/FAX: (415) 776-2475/Irvine: (714) 250-3006
ATLANTA
Don Seay, District Manager
Terry Sanders-Prentice, Sales Assistant
1400 Lake Hearn Dr., Suite 330, Atlanta, GA 30319
(404) 394-7509/FAX: (404) 255-5123
LOS ANGELES
Pam Prince, Sales Assistant
18008 Sky Park Cir., Suite 145, Irvine, CA 92714
(714) 250-3006/FAX: (714) 250-4881
DIRECT RESPONSE ADVERTISING
Response Card Decks/ActionCenter/
Networking Marketplace
Joan Bayon Pinsky, Sales Director
Clare O'Brien, Senior Account Manager
Toni Clayton, Account Executive
Eleni Brisbois, Sales Assistant
(508) 875-6400/FAX: (508) 651-1853
RECRUITMENT ADVERTISING
Pam Valentinas, Senior Account Manager
Christie Sears, Operations Coordinator
(508) 875-6400
ADVERTISING OPERATIONS
Karen Wallace - Manager of Advertising Operations
Linda Miller - Senior Account Coordinator
Barbara Hill - Classified Account Supervisor
Ann Lewis - Advertising Account Coordinator
(508) 875-6400
MARKETING
Evilee Thibeault - Vice President Marketing
Carol Leonard Fitzpatrick - Marketing Services Manager
Kristin Schiller - Marketing Specialist/Promotion
SPECIAL PROJECTS
William Reinstein, Director of New Business Devlp.
Christie Sears, Operations Coordinator
RESEARCH
Ann MacKay - Research Director
CIRCULATION
Deborah Winders - Vice President Circulation
Richard Priante - Director of Circulation
Renee Visconti - Fulfillment Manager
Bobbie Cruse - Customer Service Rep.
PRODUCTION
Ann Finn - Production Director
Cathy McPherson - Production Coordinator
Anne Nickinello - Imaging Manager
Terri Mitchell - Production Assistant
FAX: (508) 875-3090
REPRINTS
Donna Kirkey - Reprint Manager/Graphic Designer
LIST RENTAL SERVICES
Chip Zaborowski - List Rental Sales
P.O. Box 9151, Framingham, MA 01701-9151
(508) 879-0700
INFORMATION SERVICES
Jeff Pennett - Director of Information Services
Jack McDonough - Manager of Information Services
DISTRIBUTION
Bob Wescott - Distribution Manager
(508) 879-0700
IDG
Patrick J. McGovern - Board Chairman
Walter Boyd - President
William P. Murphy - Vice-President Finance

Network World is a publication of IDG, the world's largest publisher of computer-related information and the leading global provider of information services on information technology. IDG publishes over 196 computer publications in more than 62 countries. Thirty million people read one or more IDG publications each month. Network World contributes to the IDG News Service offering the lastest on domestic and international computer news.

Letters

Continued from page 45

over LANs. However, informed participants and observers in the industry know that those solutions do not represent the end of the road for video compression.

Smalley should have attended, observed and experienced the live demonstrations of delivering real-time compressed video over existing Ethernet LANs this May at ComNet '93 in Dallas, Network Delivery of Multimedia in San Francisco, and also at Comdex/Spring and Windows World '93 in Atlanta (within Microsoft Corp.'s Windows NT exhibit). If he had done so, he would know that there are new solutions that achieve the accommodations that he says are necessary for widespread use.

In addition, Smalley could attend shows such as SIGGRAPH '93 in Anaheim, Calif., GroupWare '93 in San Jose, Calif., and INTEROP 93 in San Francisco, which are all being held this month, to personally observe demonstrations of real-time videoconferencing over Ethernet and token-ring LANs that are simultaneously carrying typical LAN traffic. Such demonstrations have been, and will continue to be, conducted by many vendors, including IBM and Sun Microsystems, Inc.

I do not disagree with the many references he makes to systems that deliver one-way video over LANs. Their primary accomplishment is that they have taken existing video compression algorithms and encoding schemes — such as Digital Video Interactive, Joint Photographic Experts Group, MPEG and others, which were designed to operate over fixed bandwidth channels such as magnetic or optical disk drives and circuit-switched telecommunications lines — and made them work successfully over existing packet-switched LANs.

Two-way, real-time compressed video delivered over existing LANs has required different algorithms and encoding schemes in most cases. It has been accomplished, it works, and it is available for purchase from vendors such as IBM, Sun, Viewpoint Systems, Inc. and Compression Labs, Inc. Please don't tell readers it can't be done.

Alfred Riccomi
President
Multimedia PC Systems
Richardson, Texas

Don't hold your breath

"Just about on schedule?" Fredric Paul had to be joking when he wrote that about Windows NT in the story "Windows NT finally on the way to market" (July 19, page 4). How's this for just about on schedule:

MacWeek, July 13, 1992: "NT (New Technology) is on track to ship by the end of the year [1992] and is expected to cost less than $500, Gates said."

Computer Reseller News, Sept. 28, 1992: "Walker says that Windows NT will ship during the first few months of 1993."

Newsbytes, Sept. 28, 1992: "The new date is now 'early 1993,' with Microsoft officials saying the company 'needs more time to respond to customer suggestions for improvements in the Windows NT system.' "

Software Magazine, December 1992: "...Mike Maples, Microsoft's executive vice president, said NT would ship in April [1993]."

InfoWorld, March 15, 1993: "NT could ship to customers later than the promised date of June 30 but no more than 30 days late," Walker said.

Windows World, spring 1993: Gates said in his keynote address that Windows NT would ship within 60 days (by July 22) and that Windows NT Advanced Server would ship within 30 days of Windows NT (by Aug. 21).

PCWeek, July 5, 1993: "Gates also said Microsoft will ship Windows NT by the end of the month [July]..."

Let's hope no one is holding their breath.

Kent Rebman
Advisory marketing specialist
IBM

Help desk

Continued from page 2

are upgraded to support ISDN, frame relay and other modern services.

On Elfenbein's suggestion, Network World *contacted two vendors — Communications Satellite Corp. of Bethesda, Md., and Alpha Lyracom Space Communications, Inc. of Greenwich, Conn. — that may be able to provide some services now at your specific location.*

Prakash Chitre, associate director of COMSAT's Network Technology Division, replies:

COMSAT has developed a prototype technology to provide satellite service on demand between the U.S. and Latin America.

The service allows customers to access the INTELSAT satellite service for the bandwidth they need for private voice, data and videoconferencing. The bandwidth-on-demand technology will be extended to encompass narrowband ISDN later this year, and frame relay and a low-rate ATM interface in 1994.

Elizabeth Dickins, director of public relations at Alpha Lyracom, responds:

ISDN, frame relay and ATM availability in Latin America is highly dependent on the particular in-country infrastructure and terrestrial transmission capabilities. However, [Alpha Lyracom] would support customer requirements in Latin America, given the correct situation. Data services that Alpha Lyracom currently provides to Latin America include digital channels from 9.6K bit/sec to 6M bit/sec and higher, and very small aperture terminal point-to-multipoint services.

I'm trying to find the Electronic Mail Association (EMA). Can you provide me an electronic mail address?

Don Gregory, Lombard, Ill.

You can contact the EMA via CompuServe at 70007,2377. You can also reach the EMA through several other mail services: For EasyLink, Envoy 100, GEnie, MCI Mail and SprintMail, the address is EMA. For AT&T Mail, the address is !EMA. For Dialcom, the address is 52: PRD003. For IBM Mail, the address is USEMA001.

In addition, you can reach the EMA via phone at (703) 875-8620, via fax at (703) 522-0241 or via E-mail at 1555 Wilson Blvd., Suite 300, Arlington, Va. 22209.

CORRECTION: In providing information for the Internet access services Buyer's Guide chart (July 19, page 34), Sprint Corp. listed the wrong telephone number for information about its SprintLink service. The correct phone number is (703) 904-2167.

NETWORK WORLD DIRECTORY OF SERVICES

NetDraw Clip Art for Building Networks ™

Let your network diagrams speak loud and clear for you with *Network World's* NetDraw® clip-art software! Also soon available is NetDraw Plus™ - a stand-alone clip-art library complete with a powerful drawing application for Windows. Over 300 professionally drawn network graphics will help you communicate your networks more effectively.

Call 800-643-4668 to order your copy today!
Fax-Back Document Code #10

NetText ™
An on-line library of *Network World* articles

With a subscription to NetText™ Online you can search three full years of every article printed in *Network World* and *Computerworld*! The answers to all your network questions are just a local phone call away. Our easy to use communications software for NetText™ is available for MAC, DOS or Windows platforms.

Call 800-643-4668 to subscribe today!
Fax-Back Document Code #25

NETWORK WORLD TECHNICAL SEMINARS

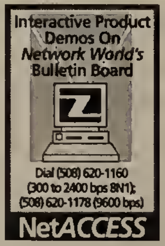
Network World Technical Seminars are one-day, intensive seminars in cities nationwide covering the latest network technologies. All of our seminars are also available for customized on-site training. Our current seminar is "Internetwork Management, Understanding SNMP and SNMPv2".

Call 800-643-4668 to sign up today!
Fax-Back Document Code #55

NETWORK WORLD INSTRUCTIONAL V·I·D·E·O·S

Our instructional video products can help you train your employees on topics from network integration to operating system software. Maximize your time and your investment by training and supporting more people than ever before.

Call 800-643-4668 to order today!


Interactive Product Demos On Network World's Bulletin Board
Dial (508) 620-1160 (300 to 2400 bps 8N1); (508) 620-1178 (9600 bps)
NetACCESS

NetACCESS
Available on *Network World's* Electronic Bulletin Board System (BBS), callers to NetACCESS can download demonstration copies of products offered by *Network World* advertisers for a trial run. To sample the variety of demos, use any personal computer to reach the BBS at 508-620-1178. (8N1, up to 9600 bps)

Reprints
Publicize your press coverage in *Network World* by ordering reprints of your editorial mentions. Reprints make great marketing materials and are available in quantities of 500-10,000.

Call Donna Kirkey at 800-622-1108 to order today!

Our instant fax-back service delivers information on many of the above products. Dial 800-756-9430 from your touch tone phone and use the appropriate document code to have information faxed right back to your fax machine!

What's NeXT for Groupware

An interview with Steve Jobs

by David Coleman

In recent months, NeXT Computer, Inc. has undergone a major change of focus, shifting from being a proprietary hardware vendor to a software vendor, offering an object-oriented application development environment on the Intel Corp. 486 platform. Yet its new mission statement targets groupware and electronic mail.

We interviewed Steve Jobs, chairman and chief executive officer, about NeXT's current and future plans for groupware.

I'll start off with a really difficult question and ask you what your definition of groupware is.

The personal computer started out to improve individual productivity, but now we've grown to where we want to achieve group productivity and organizational productivity. I think that definition is too shallow and really misses something. To capture that something, we have to go back and look at something that you wouldn't typically think of as groupware: Most people in the world who participate in running groupware are running custom applications on terminals connected to IBM mainframes.

Aren't most people today who are running group applications running them on Novell, Inc. networks?

They are doing file sharing and print sharing, but they are not running groupware applications. There are more running applications on terminals and mainframes than there are using Lotus [Development Corp.'s] Notes on a Novell network.

But hooking up a dumb terminal to a mainframe is not really considered using a groupware application. It's the old database paradigm, where you have data residing on a server or a mainframe and people are mining data or downloading it to their PC.

How is that groupware?

That's limited thinking. That's why we are not seeing groupware for what it really is. Let me give you a different picture and you can accept or reject it.

Those people are contributing a piece to an operational application that is running the core of their business. The person at the receiving dock is contributing their piece, the person in finance is contributing their piece, the person in manufacturing is contributing their piece.

In my opinion, this type of process has just as much right to be called groupware as the latest hot [graphical user interface] stuff. I think that if we look mainframe computing squarely in the eye, we will see that it was the world's first groupware and still is the most popular.

Here's another perspective: The heart of what runs the business is operational productivity. That is something that personal computers never touched.

You can't go down to Egghead and buy a shrink-wrapped application that will be a tracking system for Federal Express, or run a hospital, or do commodities trading, or help MCI enable their business-to-business products. You have to write these as custom applications, and it's been impossible to write these kinds of robust applications on PCs.

They're mostly done on Unix workstations?

They're mostly done on mainframes. Why do you think IBM is a $60 billion corporation? There are more COBOL programmers than C programmers. The majority of computing dollars and people resources are still spent on this IBM mainframe. That's where the most successful companies spend the majority of their [information technology] money.

So they happen to be [spending their money] doing it with Byzantine technology. But that's what they do. They're writing what we call mission-critical custom applications that are groupware applications, for the most part, that run on mainframes.

Now what's wrong with this? Why don't we just forget about all this new stuff and go back to mainframes? Simple. The mission-critical custom application groupware, in most cases, used to just be in the back office, accounting, manufacturing, etc.

In the past five years, the world has started to change, and those mission-critical custom applications are now required in the front office.

We believe that the single largest computing opportunity of this decade is to apply object-oriented technology to write mission-critical custom applications, primarily those that are groupware. What we think we've got in our NextStep is the first instance of an object-oriented custom application development system that allows you to write these applications literally five to 10 times faster than anything anyone has ever seen before.

So you're looking at this as a kind of groupware-enabling technology?

Absolutely. We don't know anything about commodities trading or running hospitals or anything like that. What we can do is be the tool builders to let those experts write those applications 10 times faster. In almost every case, those applications are database-driven, and they're used by large numbers of people in a groupware environment.

Today's mission-critical applications run in heterogeneous environments. Do you, in supporting groupware applications, connect to all of those different environments?

To greater or lesser degrees, yes. As an example, there is software for NextStep that lets you tie in probably more seamlessly than anything in the world to Wang networks to trade files and mail, and run applications and terminals.

We have the same thing, of course, with mainframes. In terms of PCs and Macs, NextStep has Novell network client support built in. There's a third party that supports AppleShare.

What is in NextStep that helps people deal with other people via computer? After all, that is the main idea of groupware.

I'll give you a few examples. No. 1, let's remember that the lowest common denominator in NextStep involves images and very high quality sounds in a media-rich environment. Second of all, networks are seamlessly integrated into the NeXT environment. Third, NextStep has one of the most sophisticated mail systems out there. It's based on top of [the Simple Mail Transfer Protocol] and Unix Mail and communicates with almost everything.

How do you feel about the Microsoft Corp. philosophy of adding mail capabilities to Excel, Word and whatever else the company has so you can talk from anything to anything in the Microsoft universe?

It doesn't extend to your custom applications. There are some giant problems that need to be solved. Existing mail systems are breaking down, and existing file systems are breaking down. Lotus Notes is an attempt to solve some of those problems. Because it isn't in the system itself, it's an application; it can only go a small distance toward solving those problems.

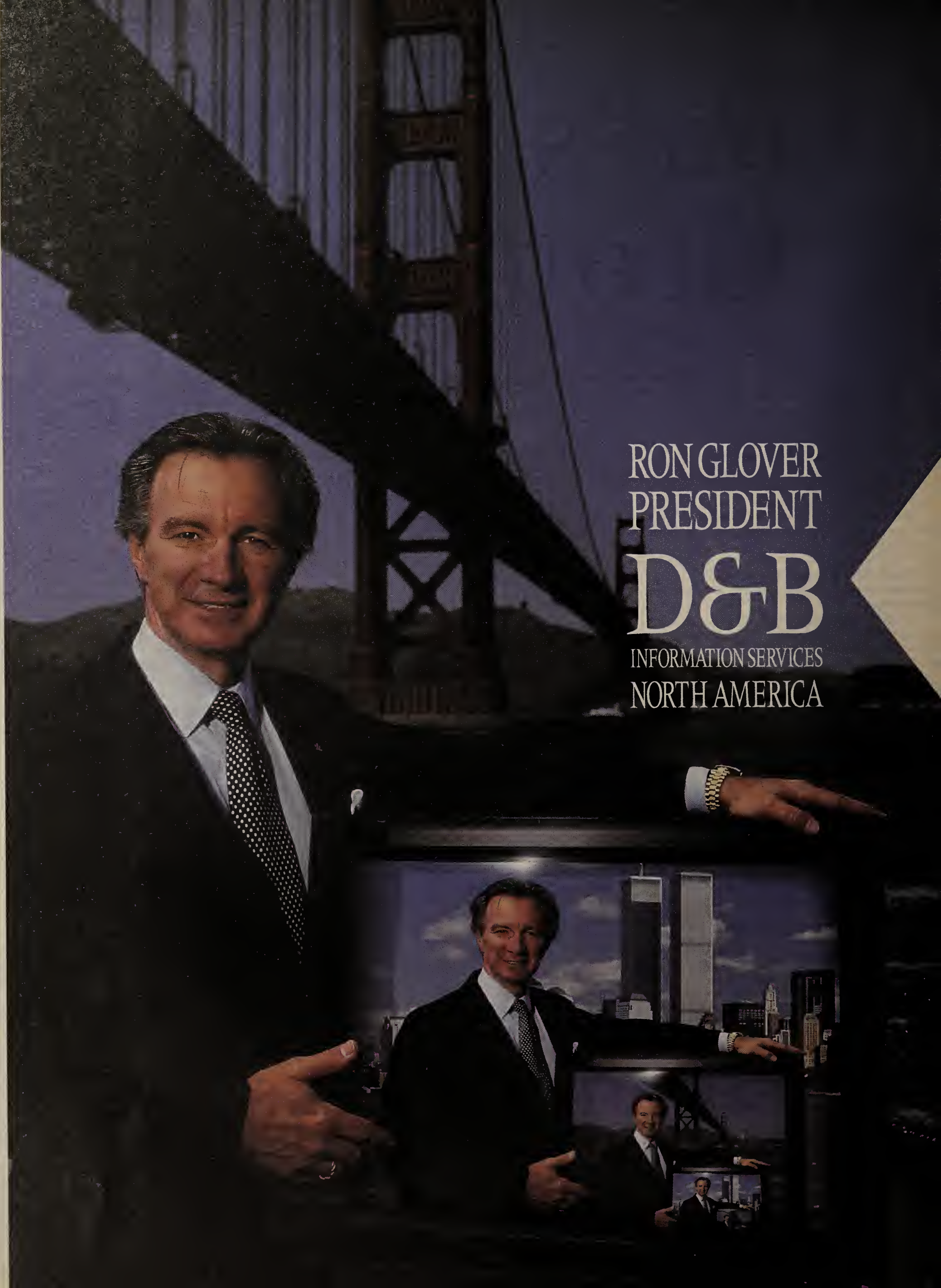
You're saying that NeXT, Apple and Microsoft are the only ones that have a chance at solving these particular problems because they own their operating systems?

The fundamental problem is a system software problem, and you need a system software-enabling solution.

What other trends are you supporting that you see as important to groupware in the next five years?

What I'd like you to take away from this exchange for your readers is the fact that the vast majority of groupware applications will be custom-built.

→ Coleman is a senior partner at SoftMark Services, a San Francisco area marketing and consulting firm. He is the chariman of the GroupWare '93 conference and editor of the *GroupTalk* newsletter. He can be reached at (415) 282-9166.


RON GLOVER
PRESIDENT
D&B
INFORMATION SERVICES
NORTH AMERICA

NEED SOME ADVICE
ON VIDEO
SOLUTIONS?
CALL
ME
1-800-846-2355
I'LL TELL YOU
BELL ATLANTIC'S A
SMART BUSINESS MOVE

We're Dun & Bradstreet Information Services, N.A. The leader in providing information to help businesses make more profitable decisions. One of the best business decisions we made was selecting the companies of Bell Atlantic* to meet our internal videoconferencing needs. To make us totally comfortable with the benefits of the technology, they proposed a 12-month trial. In just four months, Bell Atlantic had a turnkey, enterprise-wide, videoconferencing system up-and-running, linking nine offices across the country. And we're already seeing the results. The ability to call videoconferences together at a moment's notice and to bring expertise together from around the country is making Dun & Bradstreet more responsive. We're working smarter, solving problems and finishing projects faster. At Dun & Bradstreet Information Services, we help companies realize their potential with information to make better business decisions. Bell Atlantic showed us how to reach our potential with custom videoconferencing solutions. So, give me a call, I'll tell you how Bell Atlantic is helping to keep Dun & Bradstreet Information Services on the forefront of communications technology.

Bell Atlantic
We're More Than Just Talk.®

Callers will hear a recorded message from Mr. Glover, and will be given the opportunity to leave a message for him or to speak with a Bell Atlantic representative. *The Bell Atlantic family of companies includes the Bell Atlantic Systems Group, New Jersey Bell, Bell of Pennsylvania, Diamond State Telephone, the C&P Telephone Companies and other communications and information management companies. Interexchange services were provided by Dun & Bradstreet's preferred interexchange carrier; local exchange services were provided by the Bell Atlantic companies and other authorized providers in their local serving areas. © 1993 Bell Atlantic.

For More Information About These Products:

Use this coupon or Reader Service prepaid post cards inserted in the August 9 and August 23 issues. Circle the Reader Service Numbers of the ads that are of interest to you and complete the name and address information and mail to:

Network World
P.O. Box 5090, Pittsfield, MA 01203-9828

Expires 11/30/93

Name ____________________
Title ____________________
Company ____________________
Phone (   )____________________
Street ____________________
City ____________________
State ____________________ Zip ____________________
AUG

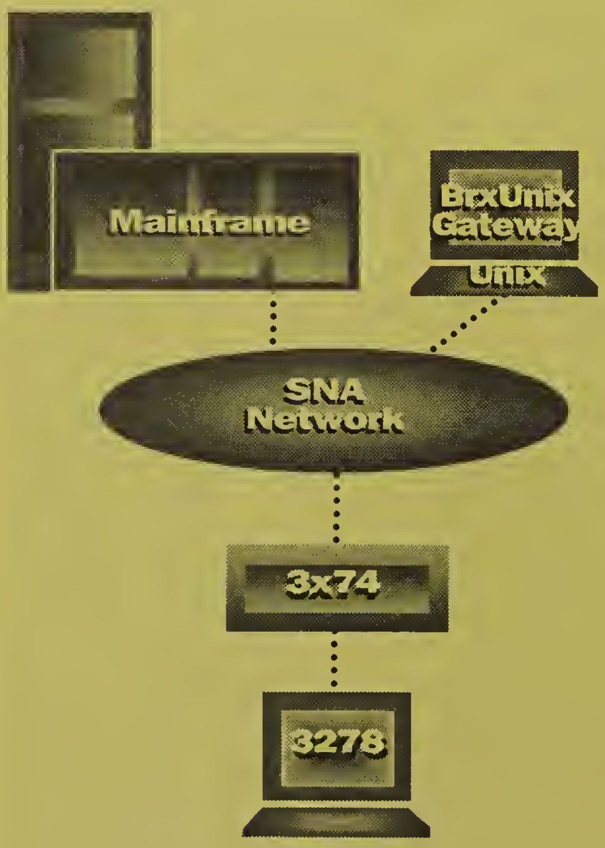
139	140	141	142	143	144	145	146	147	148
149	150	151	152	153	154	155	156	157	158
159	160	161	162	163	164	165	166	167	168
169	170	171	172	173	174	175	176	177	178
179	180	181	182	183	184	185	186	187	188
189	190	191	192	193	194	195	196	197	198
199	200	201	202	203	204	205	206		

CONNECTIVITY

Mainframes and UNIX®

3270 Users can access UNIX Applications as a VT100.

BrxUNIXGateway from Brixton Systems, Inc. is an excellent tool for introducing Open Systems into an existing SNA network. Brixton Systems facilitates migration to client-server computing by providing 3270 access to UNIX applications. 3270 terminals and printers can access such UNIX systems applications as databases, email and systems administration. Brixton's unique software BrxUNIXGateway/PU Type 5 allows users to dynamically access mainframe applications as a 3270 or UNIX applications as a VT100, while preserving the large investment in SNA network infrastructure.



BrxUNIXGateway Benefits:

No software on Mainframe.

Dynamic VT100/3270 mapping.

Protection of Investment:
- Use existing 3270 terminals to access UNIX applications
- No disruption of SNA network

Affordable Open Systems:
- Use of Open UNIX systems for communication software
- Software executes on RISC UNIX

No Vendor Lock-in or Retraining:
- Brixton supports the same Configuration, Administration and Control on RS/6000, Sun Systems, Univel and HP

Optimized Data Paths.
- Data travel only through SNA network – not mainframe

Join Brixton August 23-27
Mascone Convention Center
San Francisco, CA at:
INTEROP® 93
AUGUST
Booth #2732 South Hall

BRIXTON

How to get from Here to There.

Brixton Systems, Inc. 185 Alewife Brook Parkway Cambridge, MA 02138

"All registered and unregistered trademarks are the sole property of their respective companies."

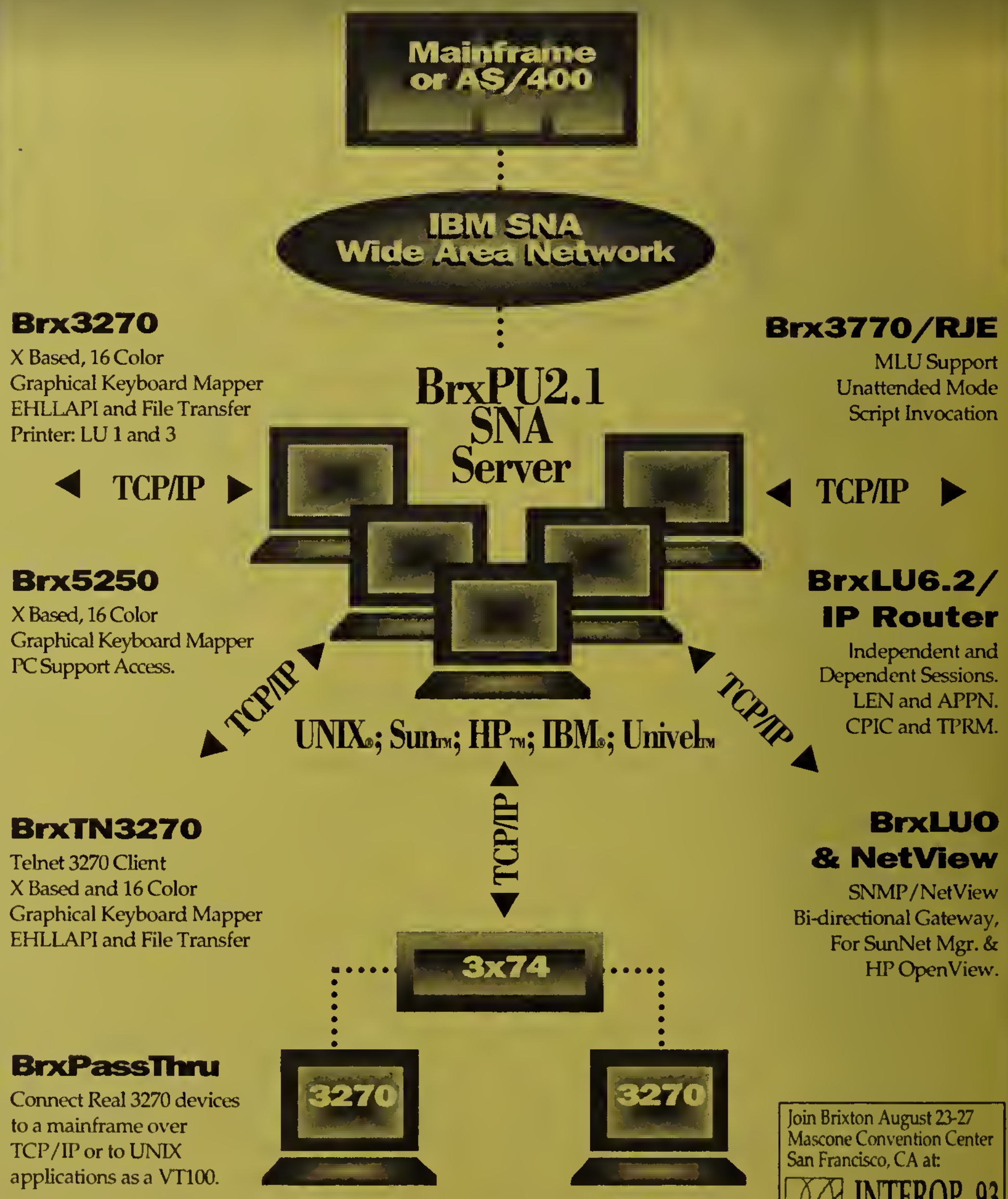
1.800.BRIXTON or sales@brixton.com
617 • 661 • 6262, FAX 617 • 547 • 9820

Circle Reader Service No. **139**

CONNECTIVITY

SNA and UNIX

Cross-UNIX Platform, Integration Architecture.



Brx3270
X Based, 16 Color
Graphical Keyboard Mapper
EHLLAPI and File Transfer
Printer: LU 1 and 3

Brx3770/RJE
MLU Support
Unattended Mode
Script Invocation

Brx5250
X Based, 16 Color
Graphical Keyboard Mapper
PC Support Access.

BrxLU6.2/ IP Router
Independent and Dependent Sessions.
LEN and APPN.
CPIC and TPRM.

BrxTN3270
Telnet 3270 Client
X Based and 16 Color
Graphical Keyboard Mapper
EHLLAPI and File Transfer

BrxLUO & NetView
SNMP/NetView
Bi-directional Gateway,
For SunNet Mgr. &
HP OpenView.

BrxPassThru
Connect Real 3270 devices to a mainframe over TCP/IP or to UNIX applications as a VT100.

Join Brixton August 23-27
Mascone Convention Center
San Francisco, CA at:
INTEROP® 93
AUGUST
Booth #2732 South Hall

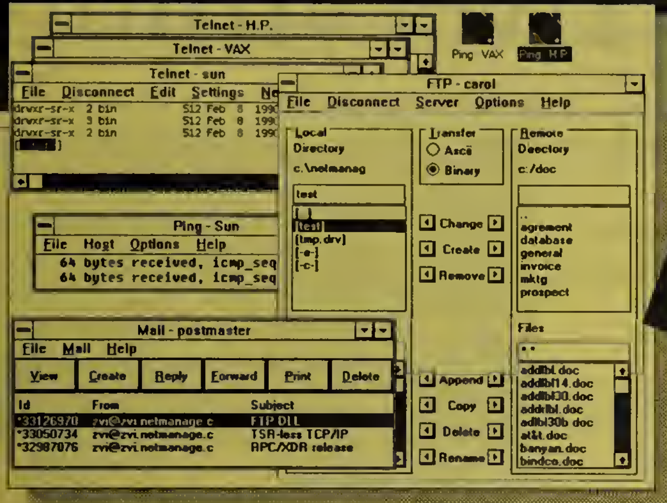
BRIXTON

185 Alewife Brook Parkway Cambridge, MA 02138 Tel.(617)661-6262 Fax(617)547-9820 Email; sales@brixton.com

"All registered and unregistered trademarks mentioned above are the sole property of their respective companies."

CALL FOR DETAILS 1.800.BRIXTON

Circle Reader Service No. **140**



TCP/IP for Windows

- All applications are both client and server
- Works concurrently with Netware, LAN Manager, Vines, etc.
- Up to 64 concurrent sessions

NEW! NFS Client & Server

Applications:

TELNET (VT100, VT220), TN3270, FTP, TFTP, SMTP/Mail, POP2, SNMP, Ping, Bind, Finger, Whois, Statistics, and Custom

Developer Tools:

- Windows Sockets API
- Berkeley 4.3 Socket API
- ONC RPC/XDR
- WinSNMP API

May 1993

Requires only 6KB of base memory

Implemented as 100% DLL (not a TSR)

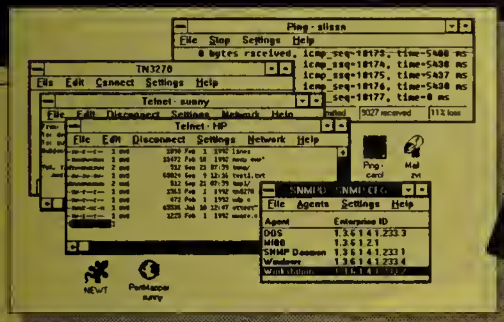
For overnight delivery call:

NETMANAGE™

(408) 973-7171

NetManage, Inc.
20823 Stevens Creek Blvd., Cupertino,
CA 95014 USA Fax (408) 257-6405

Circle Reader Service No. **141**



SNMP for Windows

May 1993

Extensible SNMP agent for Windows

- Includes MIBII, Workstation, Windows and DOS agents
- Dynamic registration of multiple agents, managers, and proxies
- ***WinSNMP API*** developers kit available
- Compatible with any SNMP manager
- Implemented as 100% DLL
- Requires only 6KB of base memory
- ***Free*** with NEWT, Chameleon, and Chameleon*NFS*

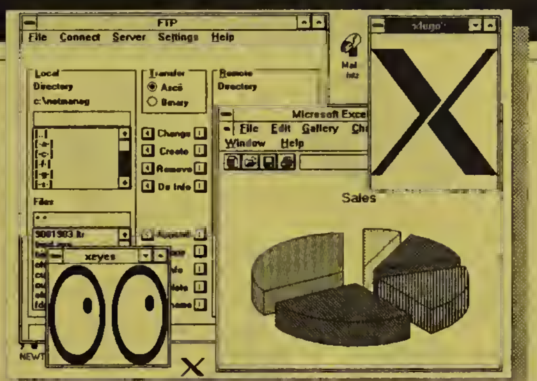
For overnight delivery call:

NETMANAGE™

(408) 973-7171

NetManage, Inc.
20823 Stevens Creek Blvd., Cupertino,
CA 95014 USA Fax (408) 257-6405

Circle Reader Service No. **142**



X for Windows

2 for the price of 1

X and TCP/IP

Optimized Pair

Highlights:

- Takes only 10 minutes to install both X and TCP/IP
- Implemented as a 100% DLL (not a TSR)
- Requires only 6KB of base memory
- XRemote, super fast dial-up option

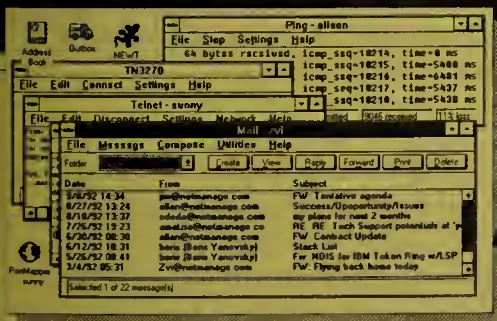
For overnight delivery call:

NETMANAGE™

(408) 973-7171

NetManage, Inc.
20823 Stevens Creek Blvd., Cupertino,
CA 95014 USA Fax (408) 257-6405

Circle Reader Service No. **144**



SMTP Mail for Windows

May 1993

- Direct access to SMTP/Unix mail from Windows
- POP2 server included
- LAN and serial link to the Internet
- Address book with groups (mailing lists)
- Multiple message viewing
- Point-and-click operation
- Implemented as 100% DLL
- Requires only 6KB of base memory
- ***FREE*** with Newt, Chameleon, and Chameleon*NFS*

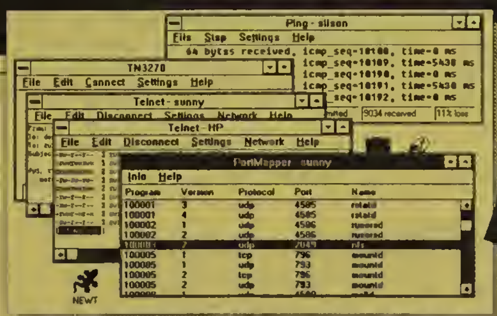
For overnight delivery call:

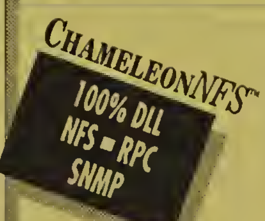
NETMANAGE™

(408) 973-7171

NetManage, Inc.
20823 Stevens Creek Blvd., Cupertino,
CA 95014 USA Fax (408) 257-6405

Circle Reader Service No. **143**





NFS for Windows

May 1993

First and only NFS client and server for Windows

First and only print client and server for Windows

- Network drives are mounted from within Windows
- Network printing in the background
- Up to 24 network drives
- Implemented as 100% DLL
- Requires only 6KB of base memory
- Included in Chameleon*NFS*

For overnight delivery call:

NETMANAGE™

(408) 973-7171

NetManage, Inc.
20823 Stevens Creek Blvd., Cupertino,
CA 95014 USA Fax (408) 257-6405

Circle Reader Service No. **145**

CONNECTIVITY SOFTWARE

Connect to Everything.

Enterprise networking has never been this simple.

WinNET *plus*™ removes the barriers between networks so you can access printers and files anywhere on your network. ***Wherever they are.***

ONLY **WinNET *plus*** allows Windows to see multiple networks simultaneously. **WinNET *plus*** is also completely integrated with the Windows desktop, including *File Manager* and *Print Manager*. Now you don't have to be an expert to network across platforms.

Banyan VINES® · Novell NetWare®
Windows™ for Workgroups
Apple Macintosh® · LAN Manager™
DEC PATHWORKS for DOS™
TCP/IP · NFS · *and more*

*Connect your enterprise for only **$149**.*

1-800-426-4368

Imagine the possibilities!

BANYAN
MICROSOFT WINDOWS COMPATIBLE
yes

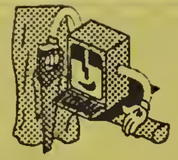
cogent

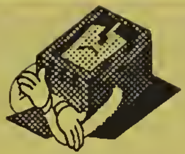
© 1993 Cogent Data Technologies, Inc. All rights reserved. All trademarks are the property of their respective owners. 175 West St. P.O. Box 926 · Friday Harbor, WA 98250 · 206-378-2929.

Circle Reader Service No. **146**

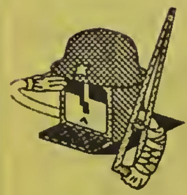
LAN APPLICATIONS MONITORING

Application Monitoring *for* Windows, DOS, and OS/2


...bad program termination


...I can't print

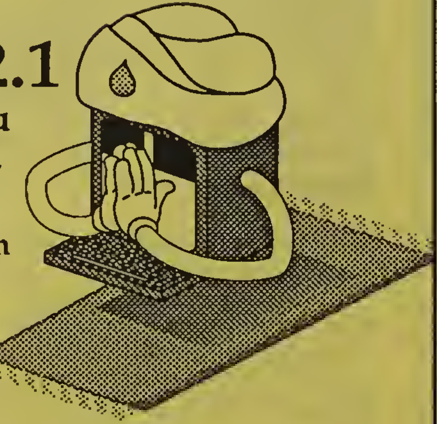
...my station is frozen

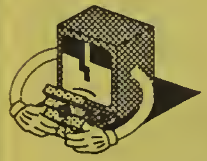

...general failure

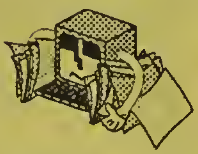
AlertVIEW 2.1

The Application Guru

will automatically discover and report these and many other frustrating application problems!




...my system crashed


...too many open files

...file not found

- Detect and report DOS, Windows, and OS/2 application problems ("I can't print", "I can't start Windows", "My machine is frozen", etc...)
- Correction procedure-- Automatically correct application problems ("unattended management console")
- Scheduled procedures-- Automatically perform housekeeping tasks (execute scheduled backup, reindexing, gateway control, etc...)
- Support for NetWare 3.11/4.0, LAN Manager, LAN Server, and other NetBIOS LANs
- Automatically forwards network alerts to remote locations via modem or cc:Mail
- Free!!! Remote Access and Inventory Software

Call (415) 694-7410 Now for a FREE DEMO

Interactive Product Demos On Network World's Bulletin Board
Dial (508) 620-1160
(300 to 2400 bps 8N1);
(508) 620-1178 (9600 bps)
NetACCESS

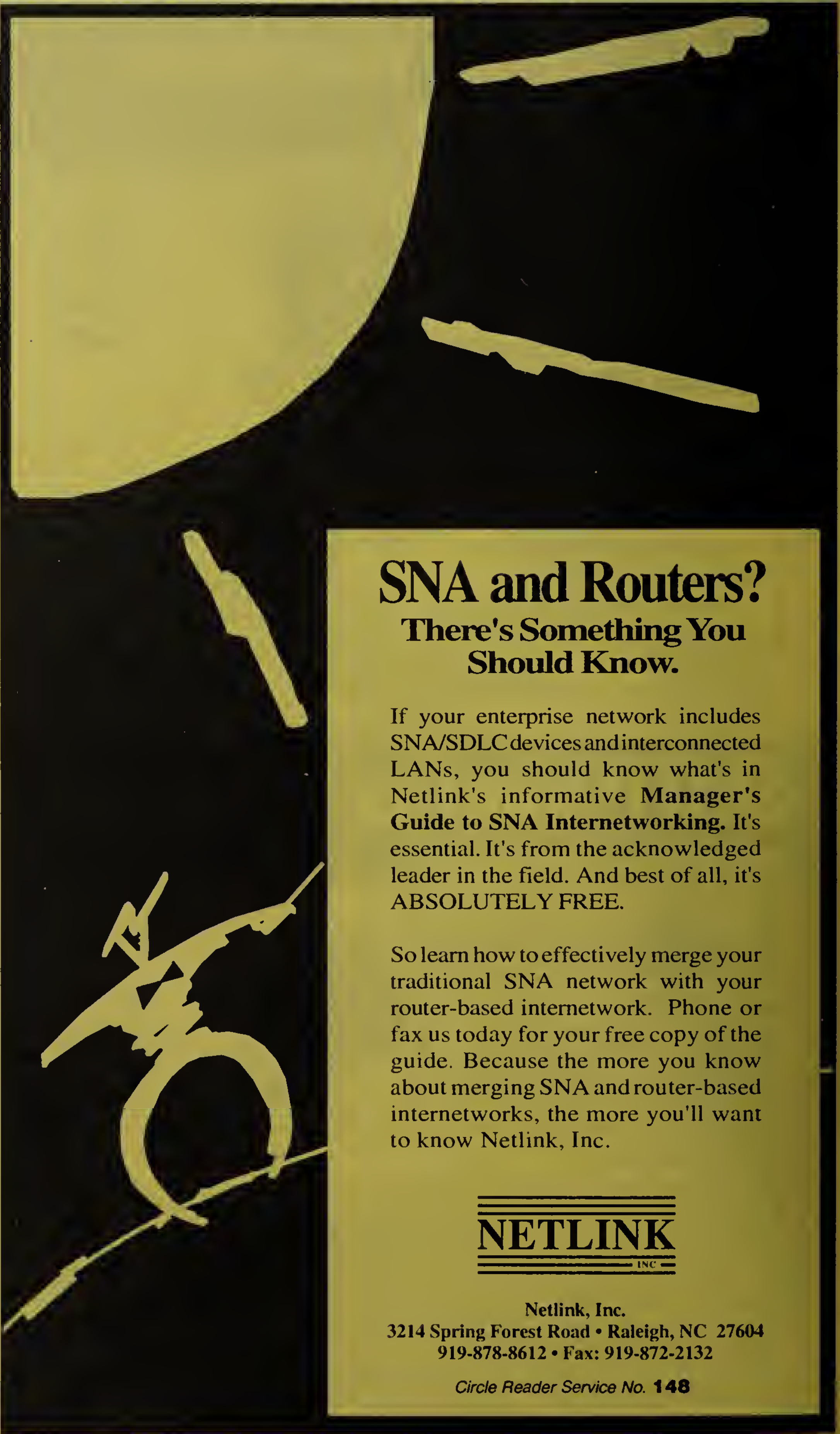
VISIT US AT:
INTEROP® 93
AUGUST 23-27 Aug
Mascone Convention Center, San Francisco, CA
Booth #5149, North Hall

Data Comm MAGAZINE
HOT PRODUCTS
1993 AWARD

SHANY
1101 San Antonio Road ● Mountain View, CA 94043 U.S.A.
Telephone: (415) 694-7410 ● Fax: (415) 694-4728

Circle Reader Service No. **147**

SNA INTERNETWORKING



SNA and Routers?

There's Something You Should Know.

If your enterprise network includes SNA/SDLC devices and interconnected LANs, you should know what's in Netlink's informative **Manager's Guide to SNA Internetworking.** It's essential. It's from the acknowledged leader in the field. And best of all, it's ABSOLUTELY FREE.

So learn how to effectively merge your traditional SNA network with your router-based internetwork. Phone or fax us today for your free copy of the guide. Because the more you know about merging SNA and router-based internetworks, the more you'll want to know Netlink, Inc.

NETLINK INC

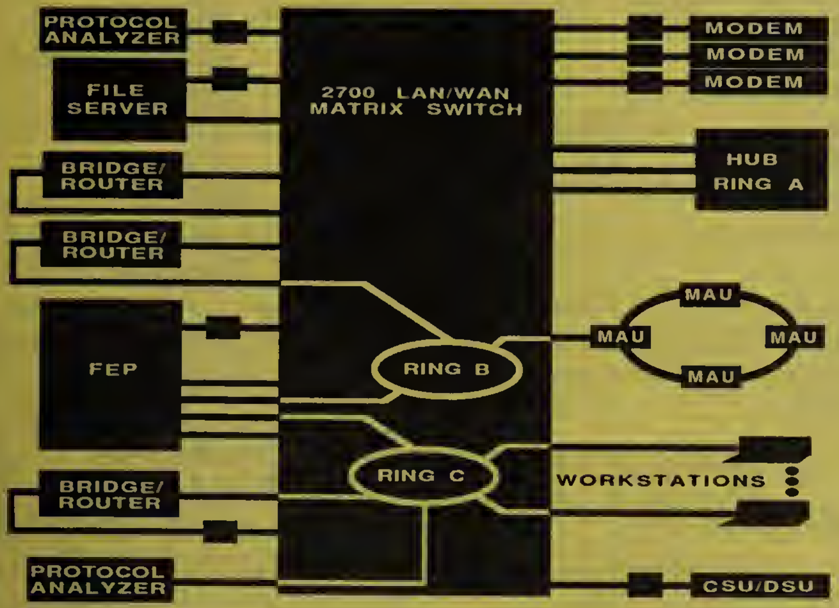
Netlink, Inc.
3214 Spring Forest Road • Raleigh, NC 27604
919-878-8612 • Fax: 919-872-2132

Circle Reader Service No. **148**

LAN/WAN MATRIX

Reconfigure and Test LAN and WAN Circuits Through One Switch!

Our New 2700 LAN/WAN Matrix Gives You Centralized Control Over Enterprise Resources



Imagine having the flexibility to control any mix of LAN, WAN, and terminal-to-host links through one switching system. That's the powerful management capability available to you only from our new 2700 LAN/WAN Matrix Switch.

- ☐ Establishes straight-through, test, broadcast, bridge, and ring connections for ports/groups
- ☐ Provides Integrated diagnostic and analysis tools for LAN and WAN links
- ☐ Enables resource sharing and instant sparing of LAN/WAN devices
- ☐ Supports up to 1024 Token Rings
- ☐ Creates fully-collapsed backbone networks for control of all rings/lobes
- ☐ Supports lobe positioning/ring splitting
- ☐ Allows easy migration from WAN environment to an all-LAN or mixed LAN/WAN environment

For more information on the 2700's advanced switching capabilities, call today. **1-800-222-0187**

*WorldCLASS Connections*SM

TELENEX CORPORATION
A UNIT OF GENERAL SIGNAL

Matrix Switching Systems
13000 Midlantic Drive, Mount Laurel, NJ 08054
Phone: 609-234-7900 • Fax: 609-778-8700

Circle Reader Service No. **149**

TRAINING VIDEOS - NOVELL NETWARE

SOFTWARE TRAINING VIDEOS
1-800-937-3279 EXT 90

NetWare 3.X Videos

NetWare Basics $125.00
Teaches what hardware & software components are needed for a network, how to log-in, create & maintain a NetWare directory as well as how to create, modify, and delete network & search drive mappings. 70 min.

NetWare Security $125.00
Covers the basic concepts of NetWare security including passwords, rights security, inherited rights masks, trustee rights, attributes & file server security. 67 min.

Menu & File Server Utilities $125.00
Explores the menu driven utilities of NetWare. Learn how to create & manage users and groups in NetWare's SYSCON utility as well as the supervisor options of SYSCON. 66 min.

Menu & File Server Utilities $125.00
Covers additional menu utilities like FILER, SESSION, DSPACE, & SALVAGE. Learn about file server utilities, NetWare Loadable Modules (NLMs) & Remote Console utility. 106 min.

NetWare Printing $125.00
Discover the printing services that are available on NetWare. Learn about utilities like PCONSOLE, CAPTURE, & NPRINT, plus how to create, configure, install & maintain the print server & queues. 83 min.

Login Scripts $125.00
Introduces NetWare users to System, User, & Default login scripts. You'll learn order of execution, the commands, & advanced tips for creating login scripts. 74 min.

Custom Menus $125.00
Find out how to customize the Netware environment for your users. Learn how to create, maintain, & execute menus. 33 min.

Combination - 7 tapes $695.00

NetWare 3.X Installation 69 min $125.00

Installing WordPerfect 5.1 on a Novell Network 101 min $125.00

Combination - 9 tapes $895.00

LANtastic Videos

LANtastic Basics $59.95
Mike Montgomery begins with the installation of the software and covers basic operation of the software. You'll learn about using LANcheck, the LANtastic Menus, and LANtastic's main features. 50 min.

Management & Security $59.95
This tape teaches users how to manage and protect their files. Sections include, user accounts, passwords, data backup, shared resources, accessing control lists, virus protection, and much more. 30 min.

Server Configuration & Performance $59.95
You'll learn about server startup parameters, using LAN cache, using ALONE and dedicated servers. 65 min.

Network Printing $59.95
Find out how to effectively use your printer as a network tool. Includes sections on printing basics, creating a printer resource, managing print jobs, the redirector buffer, the timeout value, and much more. 40 min.

Networking Windows $59.95
For those who use Windows, this is the tape that will satisfy your networking needs. This tape contains sections on installation, configuring workstations, and using LANtastic for Windows. 60 min.

Combination - 5 tapes $240.00

Other Videos Available from LearnKey:
WordPerfect Series
Desktop Publishing Series
WordPerfect for Windows Series
Supercharging DOS Applications
Lotus 123 Series
Windows 3.1 Series
Excel Series
Harvard Graphics

[illegible]

LearnKey [illegible]

Call, write, or FAX for a *FREE* Catalog!

1-800-937-3279 ext 90 FAX 801-224-8211

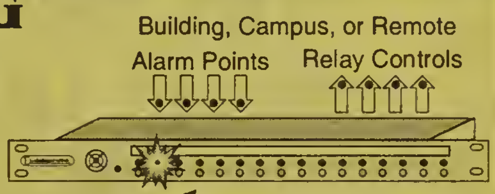
Circle Reader Service No. **150**

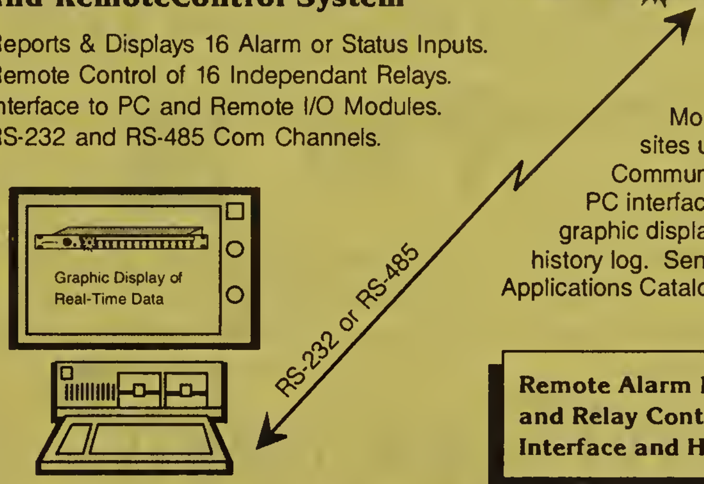
ALARM REPORTING

COMMUNICATING ANNUNCIATORS

The Ultimate Alarm Reporting and RemoteControl System

Reports & Displays 16 Alarm or Status Inputs.
Remote Control of 16 Independant Relays.
Interface to PC and Remote I/O Modules.
RS-232 and RS-485 Com Channels.





Monitor and control remote sites using the most advanced Communicating Annunciators. PC interface and software provide graphic display, remote control and history log. Send for Complete Applications Catalog.

Remote Alarm Reporting and Relay Control. PC Interface and History Log

dataprobe INC
170 Coolidge Avenue, Englewood, NJ
Phone: 201-569-6464 Fax: 201-894-0939

Circle Reader Service No. **151**

CSU/DSU

Telemate DIGITAL PORTS

- Internal Timing
- Auto Diagnostic
- DDS Slave Timing
- Remote Testing

Our TDPorts range from 56K High Performance CSU/DSU's to Multi-point, Multi-speed CSU/DSU's. TDPort 5 and TDPort 6 provide 2 and 4 channel multiplexing for ultimate speed adaptation. TDPorts are synchronus/asynchronus with RS 232 and V.35 interfaces, and they are all rack mountable. Prices range from $445 for TDPort 1, to $995 for TDPort 6.

PRICE/PERFORMANCE CHAMPIONS
Connects you to Digital Networks with Reliability and High Performance.

Telenetics™
The Performance Champions

26772 Vista Terrace Dr.
Lake Forest, CA 92630
(714) 455-4000
FAX: (714) 455-4010

Call Today For More Information!

Circle Reader Service No. **152**

DIGITAL LINK SIMULATORS

Programmable Network Link Simulators

Don't Gamble With the Reliability or Performance of Your Network

The Adtech SX/12 and SX/13 Data Channel Simulators let you test your telecommunication equipment's handling of real-world network impairments to ensure system reliability and performance before you bet your business on it. Ideal for testing WANs, bridges, routers, multiplexers, inverse multiplexers, video conferencing equipment, etc. Simulate data links for reliability and performance tests, network equipment evaluations, product development, manufacturing tests, etc. These instantly available links range from RS-232 through T3 and SONET. You can program channel and subchannel delays, Gaussian errors, burst errors, targeted errors and more.

The SX/12 and SX/13 feature:

- ❑ **Data rates up to 2.048, 8.448, or 51.84 Mbps**
- ❑ **Delays up to 10 seconds in 1 ms, 1us, or 8bit steps depending on model and data rate**
- ❑ **Gaussian and burst error generation with rates from 9.9×10^{-1} to 1.0×10^{-12}**
- ❑ **Program complex sequences of link events**
- ❑ **Options permit targeting errors and delays at specific bits and subchannels of links**
- ❑ **Over 10 plug-in link interfaces available from RS-232 to DS-3(T3) and SONET STS-1**
- ❑ **IEEE-488 or RS-232-C remote control ports**

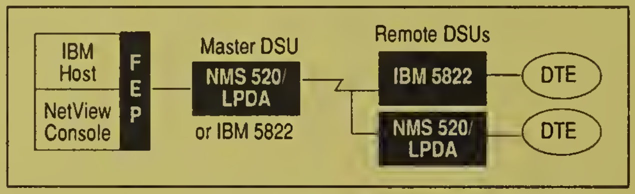
ADTECH INC
1814 Algaroba Street
Honolulu, HI 96826

Call or fax for more information or a demonstration: 808-941-0708 or Fax 808-946-1300

Circle Reader Service No. **153**

IBM COMPATIBLE DSU

THE NMS 520/LPDA BEATS THE IBM 5822.



Only GDC offers a software-programmable DSU that's completely compatible with the IBM 5822 — and offers additional features at a lower price. The most advanced DSU on the market, our new NMS 520 Diagnostic Data Service Unit has a unique LPDA-2 option to make it line-compatible with IBM's 5822 series DSUs. This option also makes it compatible with IBM's NetView network management. Other features include support for more extensive centralized control of configuration, surveillance, and comprehensive diagnostic testing, plus line measurement capabilities. For more information, call +1-203-792-0542. In North America, call toll free 1-800-777-4005.

General DataComm

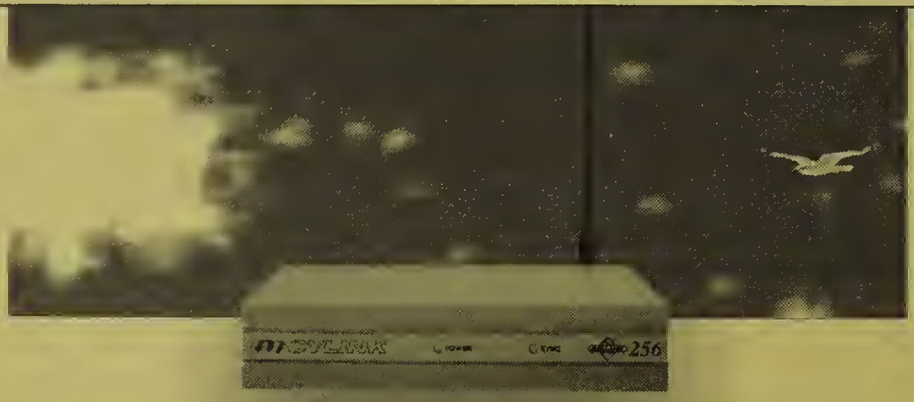
WORLD CLASS *inter* NETWORKING

World Headquarters 1-203-574-1118 Hong Kong 852-526-5511 Canada 1-416-498-5100 Australia 61-2-956-5099
United Kingdom 44-734-774868 Europe, Africa, Middle East Headquarters 33-1-48133470 Japan 81-3-3862-1730

GDC and General DataComm are trademarks of General DataComm Industries, Inc. NetView is a trademark of IBM Corporation.

Circle Reader Service No. **154**

INSTANT WIRELESS COMMUNICATIONS



Instant Wireless Communications

Set up economical network links with AirLink wireless digital modems, within or between buildings, up to 30 miles away, in minutes. Just plug in your voice, computer, LAN, or videoconferencing equipment, set a few switches and you're ready to fly. Airlink modems come in various speeds: 64, 128, 256 kilobits/second, and fractional T1. No license, no red tape, no carriers, no wires. Contact: Cylink Corporation, 310 North Mary Avenue, Sunnyvale, California, USA, 94086. Toll-free (USA): 800-533-3958, FAX: 408-720-8294, Telephone: 408-735-5800. Worldwide sales & support.

AIRLINK

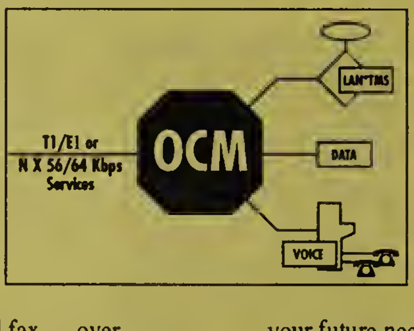
England: Cylink, Ltd., Hampshire—TEL +44 256 468186 • FAX +44 256 24156
Singapore: Cylink Corporation—TEL +65 336-6577 • FAX +65-334-1429
© 1993 Cylink Corporation
Cylink is a registered trademark and Airlink is a trademark of Cylink Corporation.

CYLINK.

Circle Reader Service No. **155**

MULTI-MEDIA INTERNETWORKING

EXTEND YOUR BACKBONE TO THE BRANCH OFFICE.



Link remote branch offices into your corporate network via "groomed" N X 64 Kbps digital services with GDC's powerful new Office Communications Manager (OCM). The OCM*TMS accommodates multiple applications — data, voice, video, LAN, and fax — over cost effective transmission facilities such as FT-1/FE-1 and generic digital services. The OCM*TMS enables you to combine many remote locations onto a single T1/E1 facility terminating at a backbone node. To protect your investment, the OCM*TMS software-based technology offers downloadable upgrades for your future needs. Call +1-203-792-0542. In North America, call toll-free **1-800-777-4005**.

General DataComm

WORLD CLASS *inter* NETWORKING

World Headquarters 1-203-574-1118 Hong Kong 852-526-5511 Canada 1-416-498-5100 Australia 61-2-956-5099
United Kingdom 44-734-774868 Europe, Africa, Middle East Headquarters 33-1-48133470 Japan 81-3-3862-1730

Circle Reader Service No. **156**

NATIONAL SERVICE

At Telsource we want to do more than make a sale to you.

We're out to build a relationship.
Through service.
Therefore:

1. **We select or develop a quality product.**
2. **We price it fairly.**
3. **We ship it immediately.**
4. **We service it. Period.**

a Service First Corporation
TELSOURCE

FREE

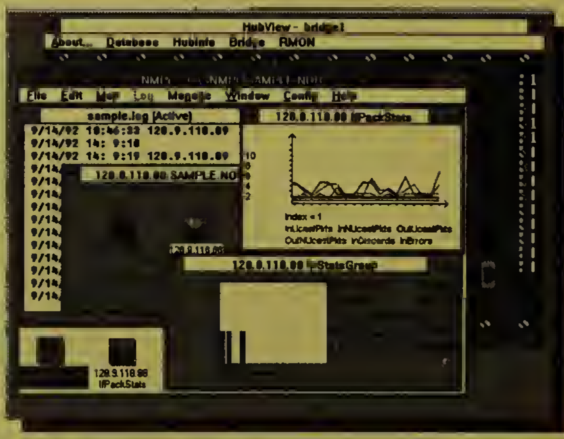
Free 10 page brochure when you call us at **1-800-788-8824 Ext 123.** or circle the reader service number on this ad.

Circle Reader Service No. **157**

NETWORK MANAGEMENT

SNMP Management

Packed with features, and only $495, ***SNMPc***™ is the smart choice for Windows™ Network Management.



```
9/14/92 10:46:33 128.9.118.89
9/14/92 14: 9:18
9/14/92 14: 9:19 128.9.118.89
```

- Hierarchical Maps
- Node Discovery
- Generic Hub Display
- MIB Compiler
- MIB Table View/Edit
- Event Action Filters
- Remote Alarms
- DDE/API Interface
- Supports any TCP/IP

30 Day Guarantee, 1 Year Free Update, and much more...

Castle Rock *Computing*
20863 Stevens Creek Blvd. Suite 530 Cupertino, CA 95014

1-800-331-SNMP
Fax 408-252-2379

Circle Reader Service No. **158**

PATCHING AND SWITCHING

Patch-n-Win!

V.35 ADC

EIA 530 ADC

RS-449 ADC

Whatever your interface, ADC's full line of tech control patching products and accessories gives you the best value in network access, test and troubleshooting. ADC is your winning ticket to keeping your network up and running.

RS-232 ADC

X.21 ADC

10 BaseT [RJ] ADC

For a **free** "patch-n-win" ticket entitling you to savings up to 15% through participating dealers, call **1-800-366-3891**

ADC Telecommunications®

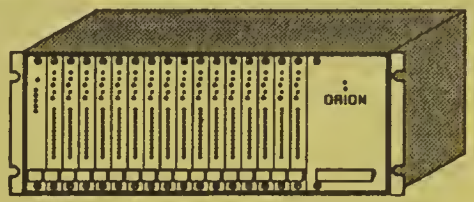
Circle Reader Service No. **159**

SNA DIAL-UP NETWORK

AN ADVANCED *HIGH-SPEED*

SNMP DIAL-UP NETWORK

Finally, an MIS expert can use a single mouse to control thousands of dial-up devices (e.g. modems, CSU/DSU, and etc.) through SNMP. Galaxy Networks is proudly presenting a complete dial-up network solution with an easy-to-use SNMP network manager based on MS Windows. Configuring & monitoring the network, implementing the diagnostic test & security control, and reporting alarms, statistics & events are as easy as "clicking". Protect your investment for the future by setting up a standard dial-up network today. CALL NOW!!!



GALAXY NETWORKS, INC.
A Global Networking Company

Tel: (818) 998-7851
Fax: (818) 998-1758

Circle Reader Service No. **162**

9348 De Soto Ave., Chatsworth, CA. 91311

PROTOCOL ANALYZER

POWERFUL

MADE IN U.S.A

Model 904

PC NOTEBOOK COMSCOPE™ PROTOCOL ANALYZER

Powerful and flexible protocol analyzer. Ideal for desktop or notebook PC. **Designed to avoid the need for a PC expansion slot.** With the Protocol Emulator Program Interface (PEPI), the Model 904 has unlimited versatility. It can monitor data lines on a full duplex basis to 12KBPS and emulate up to 64KBPS.

- Small Portable Unit
- Serial Port Operation with all PC's
- Monitors & Emulates X.25, HDLC, Async, Bisync
- Built-in BERT Tester
- Split Screen Decode of X.25 & SDLC
- Menu Driven
- Time Stamping
- Programmable

$995

TELEBYTE
TECHNOLOGY INC.

270 E. Pulaski Road
Greenlawn, NY 11740
TEL: (516) 423-3232
FAX: (516) 385-8184
1-(800) 835-3298

CONNECT - COMMUNICATE - SUPPORT

Circle Reader Service No. **160**

SYSTEMS INTEGRATOR

Network Integration

VOICE • VIDEO • DATA

FOCS designs, furnishes, installs and maintains—on a nationwide basis—the cable and wiring systems and physical layer interfaces for premises/campus information distribution. For complete solutions, contact FOCS, 50 D'Angelo Drive, Marlborough, MA 01752 or **CALL 800-989-FOCS.**

FOCS, Inc.

W A Woodhead Industries, Inc. Subsidiary

Circle Reader Service No. **163**

PROTOCOL ANALYZER

FRAME RELAY ISDN-PRI(T1) GSM DSO-A IS-41 ISDN-BRI
SINGLE PORT SMDS
SS7 TTL DUAL PORT SS#7 SNA
OSI EIA-232/449/530/V.35 X.21 G.703 V.35 ISDN-PRI(E1) ISDN EIA-232/V.24 X.25 CO-DIRECTIONAL
X.400 CMISE FTAM ENCAPSULATED LAN OVER WAN EIA-485 DECODES STATISTICS EMULATION
CONFORMANCE E1 CERTIFICATION T1

We've Set the Standard for Network Analysis. Again.

OSI. SMDS. Frame Relay. ISDN. X.25. SS7. T1/E1.

They're just a few of the protocols you can test with an INTERVIEW 8000 Multi-Service Testing Platform.

No other analyzer offers such a wide assortment of test applications and interfaces. And with dual-port testing, 2 Mbps monitoring and recording, 1.2 Gigabyte hard disk, statistical analysis, trace, and simulation, you can perform critical network tests faster than ever.

If you want one analyzer that you'll never outgrow as your network changes, one that can expand in functionality and performance, choose the INTERVIEW 8000.

For more information or an immediate demonstration, call or write today.

1-800-368-3261

WorldCLASS Connections℠

TELENEX CORPORATION
A UNIT OF GENERAL SIGNAL

AR Test Systems 7401 Boston Boulevard
Springfield, Virginia 22153 • Fax: 703-664-9011

Circle Reader Service No. **161**

VIDEO CONFERENCING

Video Conferencing for Windows

INVISION™

the first and only LAN/WAN-based Audio and Video conferencing product designed entirely for Microsoft Windows 3.1-based PCs

InVision offers you:

- Increased use of your existing PC and Network
- Increased Productivity and Efficiency
- Reduced Out-of-Office time
- Faster and Better Decision Making Cycles
- More Productive Meetings
- Reduced Travel Time

InVision is a complete solution, which:

- Allows full-motion, real-time, color video and audio teleconferencing.
- Is LAN Independent: Ethernet, Token Ring, FDDI and ISDN.
- Operates Independently of other Windows-based apps.
- Has fully Scaleable Video Window.
- Coexists with NetWare, Vines and Lan Manager.
- Uses the international standard, TCP/IP as the transport protocol.
- Complete Systems Kit includes InVision software, Intel® i750™-based Codec Board, miniature Color Video Camera, and Audio Accessory Module.

INTERVISION SYSTEMS CORPORATION

For Overnight Delivery Call:

InterVision Systems Corporation 703-506-0094

8500 Leesburg Pike, Suite 300 • Vienna, Virginia 22182 • Fax: (703) 506-0098
Internet: wk05020@worldlink.com • CompuServe: 72002,1677

Circle Reader Service No. **164**

Call for a FREE interactive multimedia brochure!

Marketplace

BIDS & PROPOSALS - DATA COMM - LANS - PUBLICATIONS - SERVICES - TRAINING

TRW TRW, an Equal Opportunity Employer and contractor is actively seeking minority, women, and service disabled owned businesses to join with it in responding to the California Department of Corrections bid, RFP CDC - 2001.

The RFP seeks proposals for the design, development, and implementation of a statewide automated offender information system for the CDC.

TRW would like to hear from you if you have demonstrated successes in any of the following areas:

Training;
— Creation of Computer Based Training (CBT) "on-line-tutorial" sessions
— Creation of "hard-copy" training materials
— Course design
— Classroom training

Data Entry;
— Conversion of existing files to new database

Installation;
— Install LAN's, WAN's, routers, bridges, workstations, etc.

Maintenance;
— Software system's maintenance
— Hardware maintenance

Project Management;
— Assist with large systems project management in complex, multi-vendor integrated systems environment

Technical Writing;
— System's design, system's implementation, and project management methods and procedures manuals and user's guides

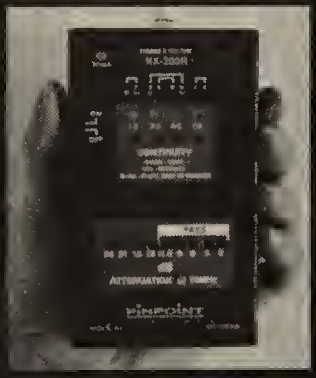
Please mail informational literature about your firm to:

Ed Shirhall, CMIS Project Room 1346,
1700 Rosecrans Avenue, Manhattan Beach, CA 90266, (310) 813-5064

TRW is an Equal Opportunity Employer

LAN TESTERS

Why pay $1500 for NEXT tester?



NX-203 10BASE-T Tester $375
Troubleshoots and fully certifies 10BASE-T UTP wiring to IEEE 802 3 standard Tests instantly NEXT (near-end-crosstalk), attenuation and continuity.

NX-205 UTP Token Ring Tester $375
Designed to debug and certify UTP cat. 3,4,5 to IEEE 802 5 and IBM - SynOptics wiring requirements for 16Mb/s passive and active retimed UTP Token Ring networks. Instantly and simultaneously measures NEXT, attenuation and continuity

PINPOINT
SYSTEMS
Phone: 510 462-0292 Fax: 510 462-0781

3COM...SMC...INTEL...NOVELL...EAGLE...NETWORTH

BUY • SELL • REPAIR • NEW • USED • EXCESS

3Com **BRIDGE COMMUNICATIONS** **NOVELL**
ETHERNET **TOKEN RING** **FIBER**

- We Sell 3Com Up To 80% Off List
- We Sell All 3Com Hardware and Software
- We Sell 3Com/Bridge Parts and Peripherals
- We Warranty All Products!

We Stock All 3Com Servers, Memory, Expansion Cab., Disk/Tape Drives, Motherboards, Power Supply, Multiconnect, Netbuilder, CS, NCS, IB, 3Station

Current Specials on New Ethernet & Token Ring

	3COM	INTEL	CLONE	NOVELL	SMC
8 BIT COAX OR TP	130	125	85	130	115
18 BIT COAX OR TP	130	125	90	140	125
TOKEN RING 18/4MB	425	450	325	•	375

QUANTITY DISCOUNTS AVAILABLE!

FIBER MADNESS!!!!!
WHILE SUPPLIES LAST:
FIBER CABLE ST/SM/BICONIC
REPEATERS/SPLICERS/MISC.
CALL FOR LOW LOW PRICES!

NEW ETHERNET STUFF

8 PORT 10BT HUB	$280
12 PORT 10BT HUB	495
2 PORT REPEATER	475
4 PORT REPEATER	595
POCKET ADAPTOR	250

*****NEW ETHERNET BRIDGES-LOCAL $1500/REMOTE T1 $3200*****
*************GREAT DEAL*************

USED 3COM ADAPTORS

501 ELINK	$75	503TP	$125
503 ELINK II	100	523TP	195
505 ELINK +	265	507TP	215
523 ELINK/MC	145	543NB	195
527 ELINK/32	375	603TOK	200
507 ELINK 16	165	605TOK+	250

NEW SYNOPTICS

1000-01 CONC.	$350
2530 CONC.	475
3000-01 CHASSIS	1200
3030-04 CHASSIS	650
505 XNCVR.	85
2510 CONC.	475

OTHER GOOD USED STUFF!

CABLETRON MT800 8 PORT XNCVR.	$400
IBM ETHERNET ADAPTOR RISC 6000	350
CDC WREN III 182MB DISK	500
3Com REPEATERS	$550
PROTEON MAU	250
PROTEON 16/4MB	275

ERGONOMIC INC.
SALES: 800-AKA-3COM (800-252-3266) • PURCHASING 516-293-5200
FAX: 516-293-5325 47 WERMAN CT. PLAINVIEW, NY 11803
WE BUY AND SELL NEW AND USED NETWORTH CORPORATION EQUIPMENT!

SAA
SNA • OSI
DIGITAL SWITCHING
TCP/IP • T1 • X.25
FRAME RELAY
LAN

TELETUTOR®
USING TECHNOLOGY TO TEACH TECHNOLOGY™

1-800-542-2242
FAX (603) 433-2260
CALL FOR CATALOG OF ALL OUR COURSES

SAVE 50% & MORE ON MOST PRODUCTS
BUY/SELL/NEW/USED
Reconditioned With Warranty
Modems • Multiplexers • T-1 • CSU/DSU's • Channel Banks •

Newbridge Channel Banks	$3995
AT&T CSU/DSU NEW!	$275
T-1 CSU's	$499
CSU/DSU 56 KBPS, V.35	$195
T-1 Multiplexers	50% Off
AT-T Channel Banks	$3995
(nationwide installation & service available)	
Datatel DSU/CSU 56KBPS	$375
Paradyne Chall 14.4 Modems	$299
Stat Muxes 4,8,16,32, port	LOW

ALL MFG'S
AND MODELS AVAILABLE

≣ METROCOM ≣

(800) 364-8838
or (713) 783-8838
FAX (713) 783-8832 24 HRS

INFORMATION DATA PRODUCTS CORP.

DSU / CSU'S
MODEMS
MULTIPLEXERS

NEW/REFURB
BUY/SELL/TRADE-IN

AT&T	N. E. T.
CODEX	PARADYNE
DCA	MILGO
IBM	UDS
MICOM	MORE ! !

800-362-3770

GREAT PRICE!

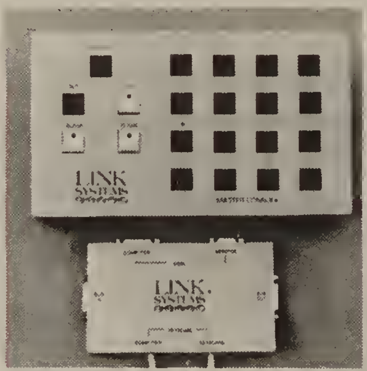
MicroANNEX ELS TERMINAL SERVER
Perfect for UNIX Networks

- 8 or 16 ports
- Easy set up
- Supports TCP/IP
- SLIP, CSLIP

Call for information
1-800-89-ANNEX

Xylogics®
THE NETWORK ACCESS COMPANY

Solve Your Video Networking Problems with LINK Products



LINK Video LAN System

PC Training Classrooms
Computer Labs
Video Control Centers

- Instructor has complete control of EVERY student PC from Instructor's PC via 100% Hardware LINK System.
- Full motion — Realtime Video
- Mono to 1280 x 1024 color
- Compatible with ALL software/ Data LANS.
- IBM/Compatibles/MAC/Sun
- Single cable daisy chain bus configuration.
- 16 & 32 station Master Consoles

LINK Rack Control System

File Servers
Communications Servers
LANS/WANS Servers

- Operation of multiple PC's using one keyboard/mouse/monitor.
- 'Safety Boot' for power interrupt
- Rack Kit available

Applied Computer Systems, Inc., 3060 Johnstown-Utica Rd, Johnstown, OH 43031 Phone: 800/237-5465 Fax: 614/892-4838.

Patricia Seybold Group

FREE-TRIAL OFFER
to
Distributed Computing Monitor

Start a trial subscription to *Distributed Computing Monitor,* the leading monthly report on distributed computing and object technology.

After reviewing your first issue, you can either pay the bill and continue receiving *Distributed Computing Monitor* or write "cancel" on the bill and owe nothing.

Fax, phone, or write us with your name and address. *Distributed Computing Monitor* is priced at $495 per year (Canada—$507; Foreign—$519).

Fax: (617) 742-1028
Phone: (800) 826-2424 or
(617) 742-5200
Mail: 148 State St. 7th Floor
Boston, MA 02109

8/16-bit Autodetect Ethernet Adapters

GenTech International *1-800-277-3679*

- 100% NE2000 compatible
- Single chip VLSI design
- 5 year warranty
- Free life time tech support
- Factory direct

Resellers call for discounts

10Base T or BNC	$59
Combo (TP + BNC)	$69
Jmprless (TP or BNC)	$65
Jmprless Combo	$75
Pocket Adapter Combo	$125
32Bit EISA Combo	$225

14140-E Parke Long Ct., Chantilly, VA 22021 Tel: (703) 263-0304 Fax:(703) 378-6813

NETWORK
BUY / SELL / REPAIR

IBM® 3Com® SMC® SynOptics® proteon®

COMSTAR Buys and Sells Excess and Used NETWORK Equipment.
NIC's/3270-5250 Emulation/MAU's/Hubs

COMSTAR, INC.
The #1 NETWORK Remarketer
1-800-735-5502
FAX: 612-835-1927
5250 W. 74th St., Minneapolis, MN 55439
IBM, 3Com, SMC, Proteon and Synoptics are Registered Trademarks.

Sell your product or service to the government!

Commerce Business Daily via Internet ftp or EMail.

Data Basix

(800)366-9562
(602)721-1988
FAX: (602)721-7240
EMail: CBD@Data.Basix.COM

BUSINESS OPPORTUNITIES - TELECOMMUNICATIONS - USED EQUIPMENT Marketplace

THE COMPLETE INTERNET SOLUTION

GLOBAL ENTERPRISE SERVICES, INC.

GES SERVICES ■ Internet access for: • individuals • local area networks • wide area networks • national and international sites ■ Enterprise-wide networking ■ Training & consulting

THE GES ADVANTAGE ■ JvNCnet: Experienced network provider ■ Turn-key, end-to-end support ■ Security solutions ■ Robust network ■ Quality services ■ Diverse customer base ■ Member of the Commercial Interconnect Exchange (CIX)

For more information contact us at:
JvNCnet: 3 Independence Way, Princeton, NJ 08540
voice: 1-800-35-tiger • fax: 1-609-897-7310
internet: "market@jvnc.net"

XYPLEX For Sale

Network 9000 with T/S, 20 port 10Base-T card, MAXServer Br/Rtr stdalone, s/w, Premium support 6 mos. old, works great.

Jim (800) 800-6499

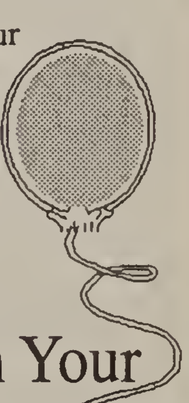
WANTED Experienced Resellers

For the following reasons we are the company you've been dreaming about...

- Highest Commissions Paid
- Commissions Paid for Life
- No Bad Debt
- Lightining Fast Provisioning
- No Dealer Fees
- No Volume Commitment

Call in Confidence
609-427-9444 x35

Reserve your space now for the Aug. 23 INTEROP issue!



Watch Your Sales Take Off!

Call Toni Clayton
800-622-1108 ext. 596

Special TCA and UNIX Expo Show Issue - September 20
Closes: September 8
Bonus Distribution
Call for further information on advertising in this Special Issue

Networking Careers

YOUR CAREERS AD COULD BE HERE

Call Pam Valentinas for Rates
1•800
622•1108

ROSENBLUTH INTERNATIONAL
Manager, Network Operations

ROSENBLUTH INTERNATIONAL, a leader in the travel management business, is currently seeking an individual to lead its Network Operations department. The ideal candidate will possess a minimum of five years' network experience and two to three years' managing operations and technical staff. Candidates must also have a knowledge of NOVELL and Microsoft products in an inter-working environment with LAN hubs, bridges and routers as well as experience in LAN-LAN and LAN-WAN communications, product/vendor evaluation and financial analysis. Exposure to computerized reservations systems (CRS) is desirable. This position would be based in Philadelphia, PA.

ROSENBLUTH offers a competitive salary and benefits package including medical, dental, vision and 401(k) as well as various travel discounts. Qualified individuals are encouraged to mail or fax a cover letter with salary requirements and a resume to Kathy Joyce, 1911 Arch Street, Philadelphia, PA 19103 (FAX# 215-557-3871). E.O.E.

10,000 copy
BONUS DISTRIBUTION

★

INTEROP
93 Fall
San Francisco
California

AUGUST 23rd ISSUE
AD CLOSE:
AUGUST 11th

Call
Networking Careers
1-800-622-1108

PROGRAMMER/ANALYST - For information technology systems consulting firm, provide programming and systems analysis to develop and maintain application softwares in billing systems for clients in telecommunications industry. Perform data processing service requests and incidental report resolutions by using different programs and softwares. Coordinate IR resolutions and DPSR's among different groups and customers. Provide system support to clients, managers, and supervisors. 40 hrs/wk; 8 a.m. to 5 p.m.; salary of $30,000/yr. Position requires a B.S. degree in Engineering or Computer Science and 6 mos. prior exp. as a programmer/analyst working in billing systems for the telecommunications industry. Position also requires knowledge of COBOL II, JCL, DB2, SQL, CLIST and REXX programming languages and knowledge of structured techniques, design methodologies, analysis techniques, and testing skills. Send resume with prior employment history to Job Service of Florida, 2312 Gulf-to-Bay Blvd., P.O. Box C, Clearwater, FL 34618-4090, and refer to job order No. FL-0876307. Candidates must be eligible for permanent employment in the United States.

INTERNET SERVICE CAREERS AT PSI

Join the premier provider of the information superhighway.

PSI's vision has been to apply the power of internetworking technology and the Internet to revolutionize the way business and all Americans work using this up and coming "4th utility". PSI is the largest Internet provider in the world in a marketplace growing by over 100% per year. We're looking for hardworking, dynamic individuals to join the PSI team to affect change.

UPSTATE NY: ALBANY

Network Operations Engineer - PSI is looking to supplement its staff of network operators with individuals who can look at the whole picture of the Internet. Qualifications: thorough knowledge of TCP/IP Internetworking software, hardware, & applications. A BS in Computer Science, Electrical Engineering, or a related field is required.

Customer Support Manager - A polished team of customer support specialists is ready for a leader who wants to take them into the 21st Century. Qualifications: a BS in Computer Science or related degree, working knowledge of TCP/IP applications, UNIX, DOS, & Macintosh, 2 years of management experience & 2 years experience in customer support.

Customer Support Staff - PSI is looking to expand its customer support team with individuals who can support customer's requirements in router integration, electronic mail, & all aspects of TCP/IP integration.

NORTHERN VIRGINIA: HERNDON

CFO - The Chief Financial Officer position reports to the President & CEO of PSI. Responsibilities include financial projections, as well as all tax issues.

Accounting Manager - This position is responsible for all aspects of accounting from billing PSI's customers to paying PSI's vendors, Minimum of 4 years experience as a professional accountant required & supervisory/management experience; licensed CPA preferred.

Programmers - Microsoft Windows & Macintosh Programmers sought.

Telecom Manager - Responsibilities include the control & management of TELECOM activities to include coordination with TELCO's, BYPASS & InterExchange Carriers for new & existing technologies. Responsible for the control & management of TELECOM facilities to include ordering, scheduling, & reporting on installation & monitoring costs.

Field Service Technicians - PSI's field service team is responsible for our global ATM & router infrastructure as well as installations at customer sites. We are looking for 2-4 years experience with data communications, modems, & DSU/CSUs on leased lines & POTS lines. Experience with routers, terminal servers, networking, & computer skills a plus. Field service positions will entail frequent travel.

SILICON VALLEY: SANTA CLARA

Field Service Technicians

Resumes to:
Personnel Manager
PERFORMANCE SYSTEMS INTERNATIONAL, INC.
165 Jordan Road, Troy, New York 12180

EOE

CHAIRMAN
George Schussel

OVER 200 INDUSTRY EXPERTS
Larry DeBoever
Chris Date
Richard Finkelstein
Shaku Atre
Jeff Tash
Will Zachmann
Ronald G. Ross
Chris Gane
John Zachman
Mike Stonebraker

INDUSTRY CO-SPONSORS
Cognos
Computer Associates Int'l
Cross Access
Gupta Technologies
IBM
Information Builders, Inc.
Informix
Intellicorp
Microsoft
Popkin Software
Powersoft
Uniface Corporation

OVER 500 EXHIBITS

Call (508)470-3870 for Exhibitor Information

BONUS: ATTEND DATABASE WORLD

DATABASE WORLD

*CLIENT/SERVER WORLD® is endorsed by the Client/Server Roundtable, a non-profit industry organization.

WORLD'S LARGEST CLIENT/SERVER EVENT!

CLIENT / SERVER WORLD

CONFERENCE & EXPOSITION

DECEMBER 8-10, 1993 • CHICAGO, ILLINOIS

6 FOCUSED CONFERENCES

- **Databases and Tools-ALL NEW**
- **Client/Server Applications**
- **Network Management-ALL NEW**
- **Enterprise Database Connectivity-ALL NEW**
- **Systems Integration**
- **Executive Client/Server-ALL NEW**

Over 20,000 Attendees will Visit CLIENT/SERVER WORLD & DATABASE WORLD in 1993!

Call (508)470-3880 to register or to receive a complete brochure.

Sponsored by:

DCI

A1C5WN

Newton gets new network links

With add-ons, Newton more than a toy.

BY FRED PAUL and
REBECCA SYKES

Boston

A variety of vendors have announced networking tools for Apple Computer, Inc.'s long-awaited Newton MessagePad, which made its official debut at the MacWorld Expo/Boston conference here last week.

Some two dozen MessagePad applications are already available, according to Apple, and more than 50 programs are being developed for release this year. Some 1,500 developers have reportedly expressed interest in writing programs for Newton.

To encourage even more developers to get involved, Apple last week announced the Newton Toolkit, a suite of Macintosh tools based on the NewtonScript programming language. The tool kit includes prebuilt modules that can be dropped into applications and customized using NewtonScript.

Even without the tool kit, programs available now include everything from crossword games and calculators to vertical market programs. But Apple and a number of third-party vendors are concentrating on connectivity. These tools will be critical to linking Newton into business networks, and without them, observers said, Newton remains an isolated toy.

Apple will ship Newton with the software and rights to work with a worldwide mail system administered by Apple OnLine Services. The system, designed to be a primary conduit for electronic mail communications between Newtons, will include gateways to the Internet, AppleLink and commercial on-line services.

In addition, major on-line services such as America OnLine, CompuServe and EasyLink are reportedly considering developing specially tailored client software for the MessagePad that would work in addition to Newton's mail client. Also, CE Software, Inc., a leading Macintosh E-mail vendor, is developing QuickAccess, a universal mail client for the Newton.

Based in West Des Moines, Iowa, CE Software said QuickMail lets Newtons linked to Macintoshes use QuickMail, Novell, Inc.'s NetWare Global Message Handling Service and applications that support the upcoming PowerTalk implementation of the Apple Open Collaboration Environment (AOCE). Pricing and availability have not been announced.

Ex Machina, Inc., based in New York, chipped in with its PocketCall terminal emulator and a new version of its Notify! wireless messaging software. PocketCall lets Newton users work with host systems via handwriting on the screen or a pop-up keyboard. PocketCall accepts add-on PocketPack modules tailored for particular database, corporate and consumer information systems. Ex Machina will initially offer PocketPacks for CompuServe, GENIE, the Official Airlines Guide, Dialog Information Services, MCI Mail, AT&T EasyLink and cc:Mail Remote. PocketCall will ship in October for about $100, with PocketPacks listed at about $50 each.

Notify! allows Macintosh and personal computer applications to send alphanumeric paging messages to Newton MessagePads equipped with the Apple Messaging Card, due out in a few months.

Notify! packages for Macintosh and Windows are already available. Ex Machina plans to ship Notify! for PowerTalk next month, when Apple delivers its AOCE extension to the System 7 operating system. The PowerTalk version of Notify! will let any AOCE-enabled application send directly to Newton devices. Notify! for PowerTalk will cost $149.

Oracle Corp. of Redwood Shores, Calif., plans to support Newton in its Glue application program interface (API) for the Oracle7 database.

The Glue API supporting Newton, scheduled to ship later this year in the Oracle7 software developers' kit, will let users connect Newton MessagePads to Oracle databases and messaging systems on Macintoshes or Windows PCs. The company plans to further integrate Newton as a mobile window into Oracle data.

©Apple: (408) 996-1010; Oracle: (415) 506-7000; CE Software: (515) 221-1801; Ex Machina: (800) 238-4738; Integration Systems: (415) 726-2020.

FastLink

Continued from page 6

ous configurations and packet sizes.

"It didn't drop a single packet, and you can't do better than that," said Scott Bradner, a consultant with the Cambridge, Mass.-based lab.

The FastSwitch 10/100 has 24 Ethernet ports, 2 Fast Ethernet ports – which are compliant with the IEEE 802.3 media access control standard – and a general 10M bit/sec Ethernet port that can serve as the 25th connection to a node or to provide a backbone connection.

With its 24 10M bit/sec ports, the FastSwitch 10/100 can support 12 full 10M bit/sec conversations simultaneously. In addition, the two 100M bit/sec ports allow for a 100M bit/sec bandwidth stream, for a total capacity of 220M bit/sec. By contrast, a traditional 10Base-T hub would have a capacity of only about 100M bit/sec, Grand Junction said.

The FastSwitch 10/100 supports those capacities via its 1G bit/sec bus, 3M-byte packet buffer and integrated Application Specific Integrated Circuits.

FastSwitch 10/100 can be managed by Simple Network Management Protocol-based management systems, in which users can define three levels of switching performance and reliability: Store-and-Forward, FastForward and FragmentFree.

The most reliable is the traditional Store-and-Forward option, which ensures error-free data transmission at the price of performance.

With the FragmentFree option, packets are switched after the first 64 bytes of the packet pass by, after which the chance of a collision is reduced.

The fastest option, FastForward, allows the frame to be passed as soon as the switch reads the destination address.

The FastSwitch 10/100 will ship by year end and is priced at $7,250.

The lower end hub in the FastSwitch family is the FastSwitch 10 which provides 10M bit/sec connections to each of 24 nodes on the net, for an aggregate forwarding capacity of 120M bit/sec. It supports the same SNMP managability functions as the FastSwitch 10/100.

Raman Khanna, director of networking at Stanford University in California, a beta-test site for the FastSwitch 10, sees the switching technology in the hub as an intermediary step between 10Base-T Ethernet and Asyncronous Transfer Mode (ATM).

"I look at ATM as a backbone option because when you consider the applications we have today and the ones we'll be running for the next three or four years, most of them don't need data rates from the client that are more than 10M bit/sec," Khanna said.

The FastSwitch hub will be available in September at a cost of $6,250.

©Grand Junction: (800) 747-3278.

Users detail interim strategies on ATM

BY BOB WALLACE

Although carriers haven't exactly been forthcoming about their ATM plans and pricing, a few users have been able to piece together information indicating that the technology will be an attractive option for building high-speed wide-area networks.

But Asynchronous Transfer Mode service is not expected to be available until the end of this year or middle of 1994, which is forcing some net managers to find other, often expensive ways of supporting user demands for high-speed WAN links.

The state of North Carolina, for example, recently announced it will spend $160 million to build a nine-city, statewide ATM network that will link 3,400 sites ranging from small, rural schoolhouses to world-class research and development facilities.

The state is working with BellSouth Corp., GTE Telephone Operations and Carolina Telephone & Telegraph for intra-local access and transport area ATM service. It is also discussing interexchange ATM links between the numerous ATM islands with several long-haul carriers.

"We're continuing to expand the existing network," said Walter Gould .

But the project is at something of a standstill as local carriers are still working to file ATM rates and get them approved by state regulators.

In the meantime, the state has been forced to sign expensive short-term leases for local spurs from its existing 50-site T-3 microwave backbone network.

"With the beginning of the project set for next spring, we've had to either lease lines this way or tell the sites to wait the eight or nine months," said Alan Blatecky, a director of the advanced networking center at MCNC, a network design firm that helped develop the plan.

The state wants to move local-area network internet traffic from the microwave systems, as well as data from a private-line IBM Systems Network Architecture net, onto the ATM net. In addition, the network will be used to support medical imaging, video-conferencing and remote visualization, or graphical simulations.

Using what limited pricing data the carriers have provided, along with the state's projected usage, Blatecky estimated ATM will cost anywhere from one quarter to half as much as an intra-LATA T-3 link. "The pricing looks very promising," he said. "If ATM wasn't cheaper, we obviously wouldn't use it."

The savings could be even larger than Blatecky's estimates because, unlike private lines, ATM service will not include a pricing element based on distance, he said.

Unlike the state of North Carolina, the University of Kentucky has decided not to expand the T-1 net that links its 14 campuses until ATM services arrive.

Doyle Friskney, executive director of communications and network systems for the University of Kentucky, said it may be less expensive for the school to run all types of traffic over a single ATM service, which requires limited equipment, than to direct the data over private lines and voice over MCI Communications Corp.'s Virtual Network service.

Like Blatecky, Friskney considered replacing existing private lines with T-3 links, but he could not justify the cost of the new multiplexing equipment that would be required.

Others see T-3 networks as a logical step toward ATM.

Boeing Computer Support Services, Inc. is currently managing the National Aeronautics and Space Administration's 15-node T-3 backbone network, which Boeing Computer Support Services sees as part of a logical progression toward an ATM network.

"We're optimizing the T-3 network for cost and performance while we wait for ATM," said Walter Gould, senior telecommunications engineer with Boeing Computer Support Services.

"We're continuing to expand the existing network," he said.

Gould is interested in ATM because of the proliferation of ATM applications such as bulk file transfer between supercomputers, graphics transmission, imaging and aerodynamic modeling. Videoconferencing use alone often takes 15 to 20 of a T-3 link's 28 T-1 channels.

In anticipation of the need for more bandwidth, Gould's firm issued a request for information (RFI) for ATM services and products in January.

The company wants to run a trial ATM network in parallel with its existing net before moving to a nationwide ATM network.

"We've seen pricing for the trial [services], and it's below current T-3 rates, which have been dropping over the last year," Gould said. "If the service works and the carriers tariff it about 10% to 15% below T-3, we'll move aggressively to ATM, starting use as early as January."

Like MCNC's Blatecky, Gould wants long-haul carriers to base the price solely on usage and would like the increments to be gigacells.

He would not say which carriers had responded to the RFI nor discuss specifics of their ATM pricing.

Gould emphasized that the rates he has seen for the trial may not be the same as the ones that the interexchange carriers tariff when they announce general availability of their ATM services.

Novell deals OSI a blow by off-loading FTAM product

BY NETWORK WORLD STAFF

Provo, Utah

In another blow to the already shaky Open Systems Interconnection movement, LAN leader Novell, Inc. took a step away from OSI last week by signing over all development, marketing, sales and support of its NetWare FTAM product line to Firefox Communications, Ltd.

Novell is one of the few companies that went through the time-consuming and expensive government conformance-testing procedures for FTAM. At one point, the company said FTAM was central to its effort to meet the Government OSI Profile (GOSIP) procurement mandate.

While Novell has many other OSI irons in the fire, including X.400 and X.500 efforts, a company of its stature backing away from the critical FTAM component is like pulling another foundation girder out from under an already wobbling structure.

NetWare FTAM is a set of NetWare Loadable Modules (NLM) that let OSI-based hosts access NetWare servers. Firefox currently sells its own NLM that lets NetWare users access OSI-based hosts and run OSI applications. Firefox, based in Kirkland, Wash., said it plans to merge the two products.

According to Jim Jackson, product-line manager for Unix and FTAM products at Novell here, the firm decided to sell off the NetWare for FTAM product because it was not mainstream enough.

But when it announced its FTAM product two years ago, Novell described it as the central piece that would enable NetWare to meet the GOSIP requirements. GOSIP dictates how an end-system computer communicates with another end system, Rick Carlson, Novell program manager said back in September 1991.

"GOSIP does not talk about client/servers," he said then. "On the Novell 3.11 server, we've got FTAM running. "That's how we satisfy the end system-to-end system requirement. The fact that we're running IPX, our proprietary protocol, from the client to the server doesn't matter. The GOSIP communications is between the server and the host."

But even while underscoring the fact that Novell was delivering on its promise to support GOSIP through products, Carlson expressed misgivings about OSI that ring eerily true in the present.

" "I spend my R&D money on what the audience will buy," he said in 1991. "And that's not GOSIP today."

GLOBAL NETWORKS

Sprint stakes claim in Canada

BY BILL BURCH

Washington, D.C.

Sprint Corp. last week announced it is acquiring one-fourth of Call-Net Enterprises, Inc., a small Canadian long-distance carrier with big plans.

In exchange for a 25% equity stake valued at $47 million, Sprint will supply the company with its intelligent network technology and back-office tools. Sprint will also license to Call-Net the rights to offer Sprint services in Canada in exchange for royalties.

"Call-Net will enter the large business and residential markets with an immediate boost from the Sprint name, Sprint's expertise and a full range of proven voice products and services — the same services available to Sprint's business and residential customers in the U.S.," said Paolo Guidi, president of Sprint International.

For the large business customer, Sprint's sharing of its net platform may eventually mean tighter links between Call-Net and Sprint services, including virtual private network offerings, according to Chris Finn, a senior analyst with TeleChoice, Inc. in Verona, N.J. Also, Canadian long-distance rates, which run 20% to 30% higher than those in the U.S., will likely come down due to increased competition, he said.

The Sprint/Call-Net partnership follows alliances between AT&T and Unitel Communications, Inc., Canada's third-largest switched long-distance carrier, and between MCI Communications Corp. and Stentor, the long-distance arm of Bell Canada.

The Canadian government last year approved resale of long-distance services and development of private fiber networks. Early next year, the country will begin presubscription for long distance, which allows users to choose a long-distance carrier for automatic access via 1+ dialing.

Founded in 1986, Call-Net is Canada's leading alternative long-distance company, providing voice and data services to some 16,000 small and midsize business customers in British Columbia, Ontario and Quebec. Call-Net uses three Northern Telecom, Inc. DMS-250 switches and several fiber routes to serve 400 metropolitan centers in Montreal, Toronto and Vancouver.

In the Canadian long-distance market, Bell Canada leads with a 70% share, while Call-Net runs second with roughly 15%, according to Susan Jeppesen, the company's vice president of marketing and product development. Last year, Call-Net earned roughly $4 million on revenues of $64 million.

IBM offers host backup for nets

BY CHRISTINE BURNS

San Jose, Calif.

Adstar, an IBM subsidiary that provides data storage and backup products, has begun shipping software that lets users archive data from networked workstations and servers on a mainframe.

Adstar Distributed Storage Manager (ADSM) takes advantage of the storage capacity of a mainframe and offers tools for automatically backing up network files and restoring them if they are lost or damaged.

"Large companies can use this to tie all their facilities together and have uniform control of backup policies and precedures," said Michael Peterson, president of the Santa Barbara, Calif.-based consultancy Peripheral Strategies, Inc.

ADSM comprises three software components, including a server piece for the mainframe that controls backup and archiving functions. The client component resides on a personal computer, workstation or file server and provides a graphical interface that lets users initate backups, find files and request access to archived data.

There is also client software that enables a systems manager to define client access to files, determine how frequently files are automatically backed up and choose how long a file remains stored on the mainframe until it is archived to a less expensive storage media such as tape.

Companies that currently market products similar to ADSM include New Era System Services in Calgary, Alberta; Enterprise Data, Inc. in Parsippany, N.J.; Network Systems Corp. in Minneapolis; and Software Partners 132, Inc. in Topsfield, Mass.

ADSM is similar to another IBM technology, Workstation Facility Distributed Storage Manager (WFDSM), which was developed in 1991. LSI Logic, Inc., a Milpitas, Calif.-based microprocessor manufacturer, was a beta user of WFDSM and ADSM. System administrator Mitch Sako said the products offer similar backup and archiving functions, but ADSM will support a wider array of servers than WFDSM, which works only with MVS mainframes.

The server component of ADSM initially supports MVS and VM mainframes. By the end of the year, Adstar expects to support OS/2 and AIX RS/6000 as servers. The company has also issued a statement of direction to support IBM AS/400 minicomputers and other non-IBM machines as storage servers.

The client software currently supports Novell, Inc. NetWare clients and servers, AIX RISC System/6000s and Sun Microsystems, Inc. workstations and servers, as well as Windows-, DOS-, Macintosh- and OS/2-based PCs.

LSI Logic's Sako said the company uses ADSM to backup files from Macintosh, DOS and Windows PCs, as well as Sun SPARC/Solaris and HP-UX workstations and servers. He said having all backup and archive files accessible through a single storage server is convenient for end users.

Servers and clients supported by the Adstar Distributed Storage Manager:

SERVER PLATFORM	AVAILABILITY
IBM MVS	Immediately
IBM VM	Immediately
AIX for IBM RS/6000	Beta 3Q
IBM OS/2	Beta 3Q
CLIENT PLATFORM	**AVAILABILITY**
NetWare clients and servers	Immediately
AIX for IBM RS/6000	Immediately
Sun SPARC/Solaris	Immediately
IBM OS/2	Immediately
Microsoft Windows	Immediately
Apple Macintosh	Immediately
DOS	Immediately
Hewlett-Packard HP-UX	3Q
SCO's SCO Unix	3Q

ADSM was also beta tested in a large company in the Northeast that used an IBM System 390 under MVS as the storage server supporting Macintosh, OS/2, Windows, AIX and Sun workstations over a Transmission Control Protocol/Internet Protocol network.

The system administrator there, speaking anonymously, said he was pleased with the ease of use of ADSM at the client level. For example, a scheduling feature allows files to be periodically backed-up transparently to the end user. He noted that any file on the ADSM system can be restored in one or two minutes, while other backup systems can take as long as 12 hours to restore a file.

©Adstar: (800) 426-2255.

Ascom Timeplex

Continued from page 11

COR lets users create LAN internets "through the interconnection of routers with virtual circuits provided by a connection-oriented network-level protocol," the company stated.

Decoupling the logical lay of the network as seen by the routers from the physical link options that are available allows for better flow control and management, simplified net management by creation of protocol-independent backbones and more efficient allocation of bandwidth to legacy protocols, the company said.

The last point is said to be one of the chief benefits of COR: the ability to ensure the integrity of mission-critical SNA sessions by allocating bandwidth to these resources and isolating them from nondeterministic LAN protocols.

If deployed in frame relay backbones, for example, users can establish permanent virtual circuits between Enterprise Routers for SNA traffic. All traffic, regardless of protocol, would be wrapped in frame relay packets and switched across the internet at the data link layer rather than the network routing layer, reducing overhead and network complexity.

Intermediate nodes only need to support protocols used by local devices, not every protocol supported by the backbone.

Ascom Timeplex said it will add support by year end for the IEEE-proposed standard Data Link Switching (DLSw). DLSw allows for the transmission of SNA data across Transmission Control Protocol/Internet Protocol nets and lets routers locally acknowledge receipt of SNA frames on behalf of remote devices. Those features help save WAN bandwidth and preserve SNA sessions.

The company said it will also support Advanced Peer-to-Peer Networking (APPN) Network Nodes (NN) in 1994. APPN is IBM's strategic network technology that allows SNA devices to communicate as peers without mainframe intervention. APPN NNs control routing and directory services in APPN networks and support APPN End Nodes.

The Enterprise Router will be available in the fourth quarter. Pricing ranges from $15,540 to $220,000, depending on configuration.

Ascom Timeplex is also expected to announce at INTEROP 93 this month several new routers to its Time/LAN Access Router family that will include the same COR capabilities as the Enterprise Router. No other details were available.

©Ascom Timeplex: (201) 391-1111.

unix to pc lan
connection

mobile
technologie

lient/server
computing

Peer-to-peer
networkin

etwork
administration

high-spee
communicatio

If It's Critical To Your Business, You'll Find It At NetWorld® Dallas.

October 5-7, 1993 • Dallas Convention Center

Today's business leaders want a place to network about networking. To learn about burgeoning strategies without totally abandoning current investments in hardware and software. To find experts with the know-how and companies with the how-to. To meet influential decision makers who make decisions.

Find Out What You're Looking For At NetWorld Dallas.

NetWorld Dallas is today's premier network computing trade show and conference. An explosive three-day event where attendees and exhibitors find logical solutions, not complex theories or pie-in-the-sky concepts. A cutting-edge show where qualified attendees, high-profile exhibitors, interactive product showcases and multifaceted educational seminars are the norm, not the exception.

NetWorld Dallas is a business-proven resource center for a host of rising new networking developments including client/server computing, mobile networking services and advanced peer-to-peer networking. Whether you're downsizing or rightsizing or looking for a UNIX-to-PC connection, NetWorld Dallas is the perfect environment to find the right products, services and solutions.

NetWorld® is a registered trademark of Novell, Inc. which has been licensed to Bruno Blenheim Inc. through October 14, 1993.
ShowNet® is a registered trademark of Bruno Blenheim Inc.

Find Out What You Need To Know At NetWorld Dallas.

NetWorld Dallas brings it all right to you via the most comprehensive educational conference and exhibit program available today. Take advantage of a business and learning forum where industry experts and international product vendors provide up-to-the-minute, relevant information to the people who need it to make their business work. And witness our unparalleled ShowNet® System, which places mission-critical information right at your fingers.

Find Out How You Can Be A Part Of NetWorld Dallas.

At NetWorld Dallas, you'll find more than just critical information. You'll find just how critical a networking event this is for your business' computing plans. For additional show information call 800-829-3976 X9580, 201-346-1400 or Fax 201-346-1602.

NETWORLD®

BLENHEIM

NetWorld '93 Dallas is produced and managed by Bruno Blenheim Inc.
Fort Lee Executive Park, One Executive Drive, Fort Lee, NJ 07024

Patrol

Continued from page 70

cations such as Oracle Financials. Patrol also plans to support Digital Equipment Corp. VMS, Microsoft Corp. Windows NT and Novell, Inc. NetWare servers.

The product is designed to comply with existing management products. It works with SunConnect's SunNet Manager to let net managers drill down beyond a server to monitor applications running on it and is being enhanced to work with Hewlett-Packard Co.'s OpenView.

"We're looking to be a team player by working with systems and network management vendors. If we go to customers and tell them we've got it all, we'd scare them away," said Martin Picard, a former Oracle communications product manager, who left the company several years ago to launch Patrol.

Oracle has helped fund Patrol and markets DDS/Patrol in Asia and Australia. Patrol's core team consists largely of former Oracle employees, according to Vinny Smith, a former Oracle worker, who is vice president of sales and marketing at Patrol .

DDS/Patrol, which is installed at about 50 companies, consists of two components – console software and agents.

The console software resides on a workstation or terminal and provides a network, systems or database administrator with a Motif-based view of databases, Unix systems and server-based applications. When installed, DDS/Patrol automatically conducts a networkwide search of databases, applications and systems and creates icons to represent them. The icons change color and flash when their statuses change.

The console gives the administrator custom views of the network via graphical meters and dials akin to those on a car dashboard. From the console, the administrator can act on problems. For example, by clicking on an icon, the administrator can move a segment of a database to another system or shut down a server with a disk problem.

The information displayed on the console is relayed by the agents, which are scattered across the systems being monitored. Agents collect statistics and watch specific systems, such as a Unix computer, and applications, such as a database.

The agents contain rules-based libraries that enable them to act on problems. If the agent cannot solve the problem on its own, it alerts the console using the Transmission Control Protocol/Internet Protocol.

An administrator can update the agents' knowledge libraries anytime. Having expertise libraries within the agents reduces net traffic and allows agents to handle problems even when links to the console are out.

Platforms supported by DDS/Patrol include the Sun Microsystems, Inc. OS 4 and Solaris 2.2, DG-UX, HP-UX, IBM AIX, as well as those from Silicon Graphics, Inc. and Sequent. Future ports will include VMS and Ultrix from DEC, OSF 1, The Santa Cruz Operation, Inc.'s SCO Unix and Windows NT. There will also be a Novell NetWare Loadable Module version of DDS/Patrol.

Michael Higgins, technical support manager for Byer California, a San Francisco-based apparel manufacturer, chose DDS/Patrol over EcoSystems' software largely because it found DDS/Patrol easier to customize using its own development resources. DDS/Patrol has saved Byer California time and given it the ability to manage applications proactively, he said.

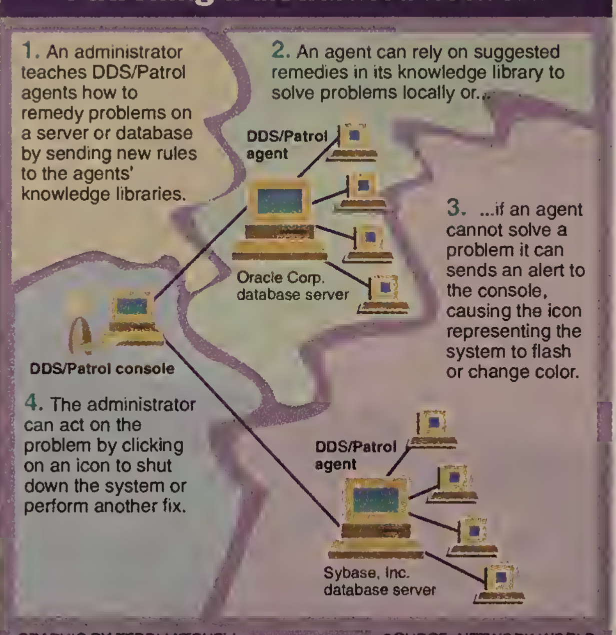
"You can do a lot of the things [DDS/Patrol] handles by hand, but what's attractive is that it does these things automatically and provides a graphical history," said Higgins, who uses the system to monitor database table utilization.

Dan Spiner, managing director of Progressive Strategies, a New York-based consulting firm, said, "While there are plenty of management systems available, this is the only product I've seen that fits the need for managing distributed applications."

DDS/Patrol is available now for $10,000 to $25,000 per console.

©Patrol: (415) 508-2900.

Patrolling a distributed network


1. An administrator teaches DDS/Patrol agents how to remedy problems on a server or database by sending new rules to the agents' knowledge libraries.
2. An agent can rely on suggested remedies in its knowledge library to solve problems locally or...
DDS/Patrol agent
3. ...if an agent cannot solve a problem it can sends an alert to the console, causing the icon representing the system to flash or change color.
Oracle Corp. database server
DDS/Patrol console
4. The administrator can act on the problem by clicking on an icon to shut down the system or perform another fix.
DDS/Patrol agent
Sybase, Inc. database server

GRAPHIC BY TERRI MITCHELL SOURCE: *NETWORK WORLD*

SMDS

Continued from page 1

The carrier will provide on-site maintenance as well as management from its LAN Management Center.

Pacific Bell's SMDS is a metropolitan-area switched digital data service that operates at speeds starting at 1.17M bit/sec, and carries a onetime installation fee and a monthly charge ranging from $600 to $800 for unlimited use of the service. Pacific Bell includes the cost of the access link in the monthly charge.

PacBell's Switched Multimegabit Data Service

Deployment:
- In all but 2 LATAs, including Los Angeles, San Diego, Sacramento and San Francisco

Pricing:
- Onetime installation charge: $1,699
- Monthly charge: $763 (includes T-1 access link)

Features:
- Group addressing: $25 onetime installation fee plus $10 a month
- Call detail: $15 a month
- Address screening: No charge

GRAPHIC BY SUSAN SLATER SOURCE: PACIFIC BELL, SAN FRANCISCO

Under the company's current network configuration, personnel at remote offices that have IBM 3270 terminals or NCR Corp. workstations access applications – including membership, insurance, claims and client information systems – on CSAA's mainframe here over a multidrop network.

But CSAA has run into a plethora of congestion and performance problems using the low-speed lines, which have an average of six drops, Gilboy said. "The network was built over 15 years ago and just couldn't handle heavy traffic," he said. CSAA considered moving to a digital 56K bit/sec network but decided against it because "it was just barely going to work."

"We didmodel and compare some applications, including imaging, in January and February and learned that a finely tuned [56K bit/sec] line provided marginal performance," he said. "The [56K bit/sec] line could only handle the applications for a very short period of time and wasn't worth the investment."

The firm also thought about a fractional T-1 network but learned that the cost would be roughly the same as SMDS. However, SMDS offers more capacity to handle growth in high-bandwidth applications such as imaging, which CSAA hopes to bring on-line in the future.

CSAA also took a hard look at building its own T-1 backbone net but did not have the staff or financial resources to run such a network. As a result, the company began investigating – and later testing – Pacific Bell's SMDS service and liked what it saw.

Considering the cost of routers and theCSUs needed to use SMDS, CSAA will not be realizing any savings up front. "We understand that we're spending more money up front than is required to run today's network," Gilboy said. "But we also know that a year from now were going to be exploiting the capacity and capabilities of SMDS."

CSAA headquarters here will initially be linked via six T-1 lines to two different Pacific Bell central offices equipped to support SMDS. CSAA will add T-1s and eventually move to a T-3 as SMDS usage grows.

Four or five CSAA sites are currently up and running on SMDS. Pacific Bell will use the service to link 50 CSAA offices in the San Francisco Bay Area with the company's host by September. The remaining sites are due to go on-line by year end.

Although most of CSAA's sites are in this area, the firm has locations in other local access and transport areas and is negotiating with interexchange carriers to link the SMDS islands.

Gilboy said SMDS' performance has been "superb," but added that CSAA will run its existing private-line net in tandem with the SMDS network for a few months.

CSAA, which is counting on SMDS to serve as the transport for its client/server computing plans. As part of a business process reengineering effort, CSAA will begin moving several of its applications from its host to servers in its offices in the second quarter of next year.

Applications to be moved include membership, insurance, customer information and claims. Some financial and back office applications will remain on the host.

Gilboy will give a presentation on CSAA's decision to use SMDS at the SMDS Interest Group meeting during INTEROP 93 on Aug. 24 here.

Switches

Continued from page 1

and resources across different business units to attack the premises ATM switch market in a focused way," said Chris Morton, general manager of Cell Relay Systems. "That's very important given AT&T's plans to roll out an ATM [network] service."

The SN-2000 ATM switches will complement AT&T Network Systems' existing GCNS-2000, a cell relay switch designed for carrier nets (*NW*, Feb. 8, page 1), and be pitted against premises-based ATM switches from the likes of Network Equipment Technologies, Inc., Newbridge Networks, Inc. and StrataCom, Inc.

The switches will undergo certification testing for use with the carrier's ATM service, which was announced in February and is set for general availability beginning in mid-1994.

GLIMPSE INSIDE

Morton declined to reveal details of the switches, saying, "We'll provide all the detail on the ATM products in the next month or two, as well as some beta customers that have tried the switches."

John Morency, a principal analyst with Strategic Networks, Inc., a Rockland, Mass., consulting firm that helped the AT&T unit define its ATM strategy, said the company will likely offer what Morency called branch controllers and premises controllers.

The SN-2000 branch controller for sites with 20 to 50 people will support two to four local-area nets, 16 to 32 terminal ports and as many as six wide-area connections. "Depending on the size of the branch, it may be just one or two WAN links, a principal leased connection and some sort of switched connection for backup or bandwidth on demand," Morency said. He estimated the box would cost $10,000 to $15,000.

The larger SN-2000 premises controller will support 51 to 256 users, eight to 16 LANs, and 16 to 24 WAN links. "The LANs could include regular and potentially switched Ethernet, 4M and 16M bit/sec token ring, and both fiber and copper FDDI," Morency said.

He estimated the device would sell for between $50,000 to $100,000.

Cell Relay Systems' Morton said the first version of the SN-2000 switches will be backward-compatible with AT&T's Acculink line of T-1 multiplexers – which are made by Tellabs, Inc. and resold by AT&T – and AT&T Network Systems' BNS-1000, a fast packet switch.

John Braskamp, director of product management for AT&T Paradyne, said he sees the Acculink products "feeding traffic into ATM backbone switches in private networks."

All products derived from the Cell Relay Systems will be built by AT&T Paradyne. Sales and marketing responsibilities will be shared, with AT&T Paradyne handling domestic efforts while AT&T Network Systems focuses on international efforts.

NCR EFFORT

NCR's ATM plans call for the introduction of switching modules for NCR's SmartHUB XE, a modular 10Base-T Ethernet LAN hub. The module is expected to be released in mid-1994, said an NCR source who requested anonymity.

At that time, NCR is also expected to ship a line of 51M bit/sec ATM adapter cards for servers and workstations. The products will let users integrate shared media Ethernet segments into an ATM backbone.

NCR is also expected to roll out a line of standalone ATM switches next year to address requirements at the LAN, departmental or "hub of hub" levels. The switches are expected to support ATM interfaces ranging in speed from 51M bit/sec to 622M bit/sec.

NCR would neither confirm nor deny plans to offer these products.

Virtual reality

Continued from page 1

the objects they contain. The objects can be defined to behave realistically, responding to either user stimulus or external data sources.

Many people associate virtual reality with an "immersive" style of interaction, in which the user dons a stereoscopic helmet to gain the sensation of being inside a virtual world. BT has opted initially for a "through the window" approach, whereby network managers use a manual input device that is sensitive to subtle changes in direction to alter their perspective as they "move" through the graphical models displayed on a monitor.

The project began about one year ago, according to Rea, and has proven successful in two regards: as a way of managing network components and explaining those components to customers and corporate network managers.

The problem with current management systems is that they represent networks using flat, two-dimensional, static diagrams. Rea acknowledged that current graphical management displays have a continuing role to play, but he said they cannot handle the range and amount of data feeds that managers increasingly have to monitor.

For its initial proof of concept, the BT Labs group chose to model the Synchronous Digital Hierarchy (SDH) network that is currently being implemented as the foundation for the company's telephone and core transport network, Rea explained.

In a demonstration of the system, Rea showed how the three logical layers of the network — access, switching and transport — were overlaid on a map of the U.K. Each layer in the 3-D model is represented by a different type of icon, and when the user approaches an icon, information such as its node name or traffic data is displayed. The icon may flash red if there is a problem.

Rea noted that the system could be refined to give more specific information about the nature of the fault.

An important aspect of the virtual reality modeling technique used by BT is its ability to integrate a multitude of real external data sources into the virtual world. "Virtual reality is about breaking down the barriers between people and databases," Rea said. "If the information is available, this provides a front end to it."

Another feature of the network model is the ability to find optimal routes by selecting beginning and end points on the network.

The system also has rich potential for collaborative problem solving. As many as eight users can simultaneously inhabit the network model. Each can observe different aspects, or one user can guide another's view so both see the same thing.

While that currently requires users to be on the same local-area network, Rea said the feature could be extended across a wide-area network. This would allow users in geographically distant locations to work together to solve a problem — say, managers at two different sites trying to sort out an international network problem.

The business benefits of using virtual reality to model complex networks may be considerable. It serves as a way of communicating complex services in an easy to understand way and helps BT's staff to quickly model how requested services may be provided. "A key area now is [virtual private networks]," Rea said. "The customer has an idea of the services needed, and this shows the customer a view of how BT perceives the network."

The virtual reality project in BT's Systems Research Division may also bear fruit in other parts of the vast laboratories at Martlesham Heath, where a lot of research and development now involves software.

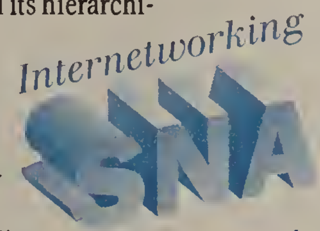
➾ Heichler is a European correspondent for IDG News Service.

SNA

Continued from page 1

frames linked via 3745 front-end processors and Synchronous Data Link Control multidrop lines to Application System/400 minicomputers at 33 remote regional offices, parts distribution centers and vehicle processing centers. The token ring-attached AS/400s, in turn, provide a 3270 emulation service that lets local 5250 terminals reach the remote hosts.

Mike Hadfield, technical specialist at Nissan, said this environment was adequate until the company abandoned its hierarchical corporate management environment in favor of a decentralized structure that gave regional offices more autonomy and decision-making responsibility.



Fanning out responsibility required greater distribution of data out to the regional branches, so the company installed servers on the remote LANs to support downsized applications.

"We knew that in order to put servers out in the remote sites and let them communicate back to corporate on a non-mainframe basis to other servers we had to put in an internetwork to make it cost-effective," Hadfield said. "We also immediately foresaw the need to go to higher speed LANs to support future distributed applications."

The internet the company installed consists of two Cisco AGS+ routers at the headquarters in Carson, Calif., that link a 40-plus token-ring campus net supporting personal computers, workstations and Banyan Systems, Inc. servers. Remote sites were outfitted with Cisco IGS routers.

The configuration left Nissan with parallel networks — one for LAN traffic and one for SNA. To cut costs, Nissan decided to consolidate the SNA net onto the internet backbone using TCP/IP encapsulation.

In the new environment, the routers encapsulate SDLC and Network Basic I/O System data inside TCP/IP packets before sending them out over the wide-area link. When the traffic reaches the token-ring net at headquarters, the router strips off the TCP/IP packet and puts it onto the local token-ring for delivery to the mainframe.

Hadfield said SNA response time has decreased by an average of 2 1/2 seconds down to subsecond response times. "It's been very well received by our end users because it takes less time to transmit batch print and file jobs down to the AS/400s."

Nissan is currently beta testing Cisco's Logical Link Control 2 (LLC2) polling feature and will begin deploying it on the production network later this fall.

Previously, the 3745s performed LLC2 polling of the remote AS/400s. Enabling the Cisco routers to provide local acknowledgements of the polls obviates the need for acknowledgment data to be sent over wide-area links and also helps keep SNA sessions active during congestion or after a failure while the router tries to find a new data path.

So far the feature has worked well in beta, he said. But the one caveat is that LLC2 termination will make net management more difficult because what was once a single session is effectively divided into three sessions: SNA LLC2 local acknowledgment from end node to router; a TCP/IP session between routers; and local acknowledgment from remote router to remote end node.

L.L. Bean is another user that has migrated its SNA net to a TCP/IP-based internet. The company first integrated its hierarchical terminal-to-host SNA net onto its Wellfleet Communications, Inc. router-based internet by using IBM's source route bridging (SRB) protocol, but due to broadcast storms and SRB's fixed-path limitations, the company made the move to TCP/IP encapsulation.

"We weren't pleased with source route bridging because it didn't provide us with any flexibility or any recovery without session failures," said Ken Carew, network communications specialist at the Freeport, Maine-based retailer. "We began pushing our vendor two years ago to give us a better solution."

Among SRB's key drawbacks is a fixed-path routing scheme incapable of offering dynamic rerouting. If the original route fails, the end devices must reinitiate the route discovery process, which can lead to session delays or, worse, to session timeouts. The process of seeking an alternate path also adds superfluous overhead on the wide-area net.

Carew said TCP/IP encapsulation alleviates the fixed-path limitation by stuffing SNA data packets into a TCP/IP envelope which can then be routed across the LAN internetwork. That way, the SNA traffic obtains the benefits of adaptive and dynamic alternate routing.

Broadcast storms are another perennial criticism of SRB in large, heavily concatenated internetworks. With SRB, end nodes establish sessions by broadcasting discovery frames that are addressed to the destination node. During the route discovery process, the discovery frames are propagated throughout the internet.

In a large net, that propagation can easily clog wide-area network links. By switching to TCP/IP encapsulation, Carew has alleviated that burden, too.

One thorny issue with SNA/LAN integration that has cropped up of late is the question of whether routers can provide SNA data with the reliability IBM users take for granted on their SNA nets. Most router vendors offer protocol prioritization features that claim to guarantee SNA traffic top billing. But both Nissan and L.L. Bean said they have yet to entrust SNA's reliability to their respective vendor's priority scheme.

Instead, both are getting around the priority issue by boosting the bandwidth of the wide-area network pipe — a workable albeit more costly solution. ◻

Cisco's DLSw strategy

Cisco Systems, Inc. last week said it will support the proposed Data Link Switching (DLSw) standard on its entire line of routers by mid-1994.

DLSw is the IBM-developed method for transmitting Systems Network Architecture and Network Basic I/O System traffic over Transmission Control Protocol/Internet Protocol backbones.

Virtually all router vendors had developed proprietary versions of a TCP/IP encapsulation method for SNA prior to IBM's delivery of DLSw. In an effort to promote multivendor interoperability, IBM last spring submitted its DLSw specification to the Internet Engineering Task Force, which, in turn, made the technology an informational request for comment, giving non-IBM vendors free access to the DLSw specification.

Cisco's DLSw implementation will include all of the features currently under development by the multivendor DLSw Working Group. Among these features are Logical Link Control 2 (LLC2) termination/local acknowledgment, reduced source route bridging and NETBIOS broadcast overhead, elimination of soure route bridging hop-count restrictions, Synchronous Data Link Control-to-LLC2 conversion, token ring-to-token ring SNA switching and SNA media access control address caching.

Cisco said its implementation will also offer extensions not expected to be part of the DLSw Working Group's specification, including subarea SDLC-to-LLC2 conversion and Ethernet SNA switching.

BY MAUREEN MOLLOY

NETWORK WORLD

161 Worcester Road
Framingham, Mass. 01701-9172
(508) 875-6400

Second-class postage paid at Framingham, Mass., and additional mailing offices. *Network World* (USPS 735-730) is published weekly, except for a single combined issue for the last week in December and the first week in January by Network World, Inc., 161 Worcester Road, Framingham, Mass. 01701-9172.

To apply for a free subscription, complete and sign the qualification card in this issue or write *Network World* at the address below. No subscriptions accepted without complete identification of subscriber's name, job function, company or organization. Based on information supplied, the publisher reserves the right to reject non-qualified requests. Subscriptions: 1-508-820-7444.

Non-qualified subscribers: $5.00 a copy; U.S. — $95 a year; Canada — $117.70 (including 7% GST, GST #126659952); Central & South America — $110 a year; Europe — $165 a year, all other countries — $245 a year (airmail service). Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin. Please include mailing label from front cover of the publication.

Network World can be purchased on 35mm microfilm through University Microfilm Int., Periodical Entry Dept., 300 Zebb Road, Ann Arbor, Mich. 48106.

Network World is distributed free of charge in the U.S. to qualified management or professionals who specify and maintain communications equipment, including voice, data and video, as well as to common carriers, consultants, systems houses and manufacturers of communications equipment.

PHOTOCOPY RIGHTS: Permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by Network World, Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus 50 cents per page is paid to Copyright Clearance Center, 27 Congress Street, Salem, Mass. 01970.

POSTMASTER: Send Change of Address to *Network World*, P.O. Box 3090, Northbrook, IL 60065.

Copyright 1991 by Network World, Inc. All rights reserved. Reproduction of material appearing in *Network World* is forbidden without written permission.

BPA

Reprints (minimum 500 copies) and permission to reprint may be purchased from Donna Kirkey, Network World, Inc., 161 Worcester Road, Framingham, Mass. 01701-9172.

ISSN number: 0887-7661.

Now You Can Pay More Attention To Your Customers And Spend Less Money Doing It.

Computer companies today are facing more and more challenges than ever before. Challenges such as the call for superior customer service. Not to mention handling more calls. Which means busier customer service representatives. As well as more busy signals. Bigger problems, smaller profit margins. How can your company provide high-quality customer service at an affordable cost? Companies like Borland, Micro-Sota, DacEasy and Philips Consumer Electronics are doing it with AT&T *MultiQuest* 900 Service.

Imagine a service that lets your customers select the customer service option that best meets their needs. That's because *MultiQuest* 900 Service can be used in a variety of ways. For example, you can supplement your general inquiry line by opening up a 900 number to provide purely technical support. Customers get the expert help they need quickly and easily—because the call goes directly to technical support staff. They can even receive faxback instruction sheets via 900 service.

But, just as important as keeping your customers satisfied is keeping your company profitable. AT&T *MultiQuest* 900 Service lets you determine the cost that your customers will pay for each call. Then, AT&T handles billing and collections and forwards the proceeds to you. So you can afford to help more and more people.

With all of these advantages you'll probably want to speak to an AT&T specialist about making AT&T *MultiQuest* 900 Service work for you.

AT&T. The Best in the Business.SM

Call: 1 800 809-0900

between 8 a.m. and 6 p.m. Central time.

© 1993 AT&T